Nutritive Value of Indian Foods

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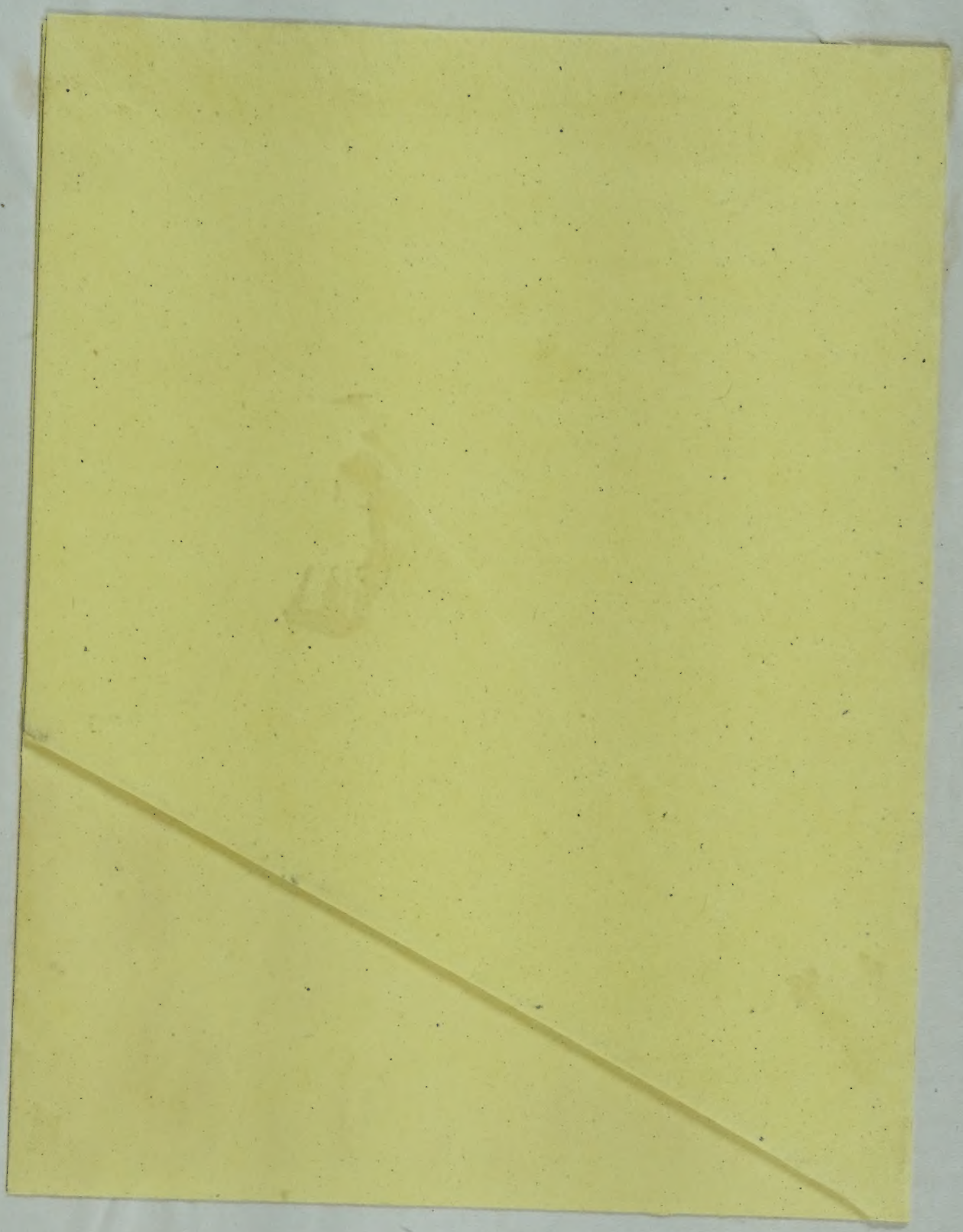

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PREFACE

THIS brochure provides a brief outline of some basic aspects of human nutrition and includes detailed information on the nutritive value of common Indian foodstuffs. This should be useful to individuals and institutions in the formulation of balanced diets suited to their needs. The information contained here will be helpful in assessing the nutritive value of existing diets and in correcting inadequacies therein through a judicious choice of available foodstuffs.

This publication should also be useful to planners and administrators in deciding on priorities with regard to programmes for agricultural production or supplementary feeding.

Information on the nutritive value of Indian foods was first published in 1937 by Dr. W. R. Aykroyd. This booklet, popularly known as Health Bulletin No. 23, underwent many revisions since then, and continued to serve the needs of public health workers, medical practitioners, pediatricians, home scientists and the general public. However, with the increasing knowledge about various aspects of nutrition, it was thought worthwhile to rewrite this publication completely.

Till recently, the formulation of nutrient requirements of our people was being mainly based on the work carried out in other countries. In recent years however several investigations have been carried out in our own centres with typical Indian diets and these have provided a firm basis for computing nutrient requirements of Indian subjects. On the basis of some of these data, a revision of the calorie and protein requirements was made by the Nutrition Advisory Committee of the Indian Council of Medical Research in 1958. In the light of further work, recommendations with regard to requirement of several other nutrients were made by the Nutrition Advisory Committee in 1968 and typical balanced diets suitable for various segments of population were drawn up.

The data presented here are based mostly on Indian work, and more particularly the work carried out in the National Institute of Nutrition, Hyderabad.

The data on nutrient content of practically all Indian foodstuffs in common use have been provided. Valuable suggestions received from scientists, field workers and others have been incorporated. An index of names of foodstuffs in Indian languages provided at the end should facilitate easy reference.

It is hoped that the book will be useful to all those interested in nutrition.

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NUTRITIVE VALUE OF INDIAN FOODS

INTRODUCTION

The food that we eat is assimilated in the body and is used for the growth and maintenance of tissues. Life cannot exist without food, and it is for this reason that every living organism strives its utmost to obtain its food requirements. Plants can manufacture the food they need from simple chemicals derived from the soil, from water and from the carbon-dioxide of the air. Higher organisms, on the other hand, do not possess the capacity to manufacture food from simple chemicals, and hence they depend on plant life or on other animals for obtaining the food they need.

An animal satisfies its requirements for food mainly through natural selection. Man, however, has a number of foodstuffs to choose from to make up his diet; and because all foods are not of the same nutritive value, the health of the person depends on the type and quantity of foodstuffs he chooses to eat and to satisfy his hunger.

Dietary habits in different regions of the world have been determined mainly by the local availability of foods, and dietary patterns necessary to

sustain reasonably good health have perhaps been evolved after a good deal of trial and error. Satisfaction of hunger is usually the main criterion for a satisfactory food intake; but the knowledge that we possess to-day does not conform to the general belief that satisfaction of hunger is a safe guide for the selection of proper foods. For sustaining healthy and vigorous life, diets should be planned with the full knowledge of the scientific facts and observations concerning the science of nutrition.

A brief outline of the general principles and considerations that govern the planning of satisfactory diets is given in the following pages. In the section dealing with dietary principles, information is given on the importance of the various nutritional constituents that are present in foodstuffs. The dietary allowances for various nutrients as recommended by nutrition experts are disscussed in the next section; and typical balanced diets that satisfy the nutritional requirements of persons belonging to different age and sex groups are suggested. The prevalent Indian diets are known to be deficient in some important nutrients, and therefore hints on improving the nutritive value of the present dietaries are also given.

The effects of malnutrition in different segments of population are then briefly discussed. Pregnant and lactating women and also young children are particularly prone to suffer from malnutrition. This point is emphasized, and practical suggestions involved in the nutritional care of these segments of population are indicated.

Available information on the composition of Indian foods is given in the Tables that follow the text. An appendix at the end gives the names of the common foodstuffs in Indian languages.

Dietary Principles

Foodstuffs may be broadly classified as cereals, pulses, nuts and oilseeds, vegetables, fruits, milk and milk products and flesh foods. These foods contain substances known as nutrients, and it is for obtaining these nutrients which perform various functions in the body that food is consumed daily by any living organism. The nutrients include proteins, fats, carbohydrates, vitamins and mineral salts. They are present in almost all foods in varying proportions and depending on the relative concentrations of the nutrients contained, foods are classified sometimes as protein-rich foods, carbohydrate-rich foods etc. Oils, ghee etc., provide mostly fat, while sugar is purely a source of carbohydrate.

Proteins, fats and carbohydrates are also sometimes called "proximate principles". They are oxidised (*i.e.*, burnt) in the body to provide the energy required for the various activities of life. Together with water, which is also a necessary dietary element, proximate principles form the main bulk of foods.

Vitamins and mineral salts do not supply energy, but they play an important role in the regulation of several essential metabolic processes in the body. Some minerals are also important components of the body structures like bones and teeth.

Human beings require sufficient amounts of proximate principles, vitamins and minerals to enable them live and thrive. A well-balanced diet should contain all these factors in correct proportions and in adequate amounts. In planning dietaries for communities, it is therefore necessary to aim at an adequate well-balanced diet. Such a diet should be of sufficient quantity to provide the needed energy and also ensure at least a minimum supply of the essential nutrients to maintain the life processes in proper working order.

Extensive research work carried out on human beings and on laboratory animals in many countries has provided a sound basis to plan adequate well-balanced diets. How much of each of the nutrients is required for good nutrition and what this means in terms of common foodstuffs is now known. With this knowledge, it is easy to measure the extent to which diets in common use are adequate or inadequate, and to estimate the amounts of the different foodstuffs needed to bring the diet of a given population upto the desired level.

Before discussing the various considerations involved in planning of diets, it would be necessary to discuss briefly about the various nutrients and their role in living systems.

Proteins

Proteins are the chief substances in the cells of the body. They form the important constituents of muscles and other tissues and of vital fluids like blood. Proteins supply the building material for the body and make good the wear and tear of tissues, which is a constant feature of the process of life, and it is for this reason that foods rich in protein are often called "body building foods". Several substances concerned with vital life processes—*e.g.* "enzymes" which help in the digestion of food, and "antibodies" which are body defences against infections—are also mainly protein in nature. Proteins are, therefore, one of the most important nutrients and the sufficiency of protein in a diet is an important measure of the adequacy and quality of the diet. Proteins are also oxidised in the body to provide energy, but such use of protein is costly and wasteful. It is better that most of the calorie requirement is met from carbohydrates and fats so that proteins are spared to fulfil other functions essential to life.

Most foodstuffs contain protein, but in widely varying amounts. Animal foods such as meat, fish and eggs are rich in protein, and milk can also be considered to be rich in protein if due allowance is made for the large amount of water present in it. Among the vegetable foods, pulses and nuts are the richest sources of protein with amounts often exceeding those present in animal foods. Soyabean is unique in this respect in that it contains over 40 per cent protein. The common cereals such as rice and wheat are relatively poor sources of proteins. However, considering the amounts of these foods that are normally consumed daily, their contribution to the total protein intake by an individual is considerable. Rice contains less protein than wheat does, but the protein of rice is of better quality. The outer layers of cereals are richer in protein than the inner starchy kernel, and hence when wheat or rice is highly milled, there is some loss of protein as well as of other valuable nutrients such as vitamins and mineral salts. Leafy and root vegetables and fruits are very poor sources of protein.

Defatted oilseed cakes which are very rich sources of protein were hitherto considered only as cattle feeds and manures. However, as a result of improvement in food processing techniques in recent years, these foods are being made available for human consumption also.

Biological value of proteins

In addition to the quantity of protein in a diet, the nutritional quality of the proteins also matters in judging the protein value of a diet. Proteins present in various foods differ in their nutritive value on account of the differences in the amino-acid composition. Amino-acids are the "bricks" with

which tissue protein is built and replaced, and therefore the more closely the amino-acid make up of a protein resembles that of the tissues, the greater is its value.

There are about twenty amino-acids commonly found in dietary proteins. It is possible for the body itself to obtain its requirements of some of these amino-acids by mutual inter-conversion among the amino-acids and from non-protein sources. However, ten amino-acids cannot be synthesized by the body, and hence have to be supplied through the diet. These amino-acids are therefore called "essential amino-acids", and it is the extent of the presence of these essential amino-acids that largely determines the quality of a protein. The proteins of whole egg and human milk are considered the best among food proteins, and the pattern of essential amino-acids in these foods is usually taken as a standard against which the amounts of essential amino-acids present in other foods can be compared.

The proteins of animal foods such as milk, meat, fish etc., generally compare well with egg protein in the distribution of essential amino acids, and hence such foods are considered to contain good quality proteins. However, the proteins in foods of plant origin are not so well-balanced in their amino-acid pattern. For instance, it will be found that in comparison with egg protein, the cereal proteins are poor in the amino-acid lysine, while pulse proteins are poor in methionine although they are rich in lysine. Such proteins individually are therefore incomplete proteins. However, the relative insufficiency in amino-acids of particular vegetable foods can be overcome by a judicious combination of vegetable foods to provide a mixture having the desirable pattern of essential amino-acids. Thus, the proteins of cereals and pulses have a mutual supplementary effect, and deficiency of one amino-acid in one foodstuff can be made good by an excess in another, if both foods are consumed at about the same time.

Another factor to be considered in assessing the value of the proteins of a foodstuff is their digestibility. In general, proteins of uncooked vegetable foods especially pulses) are less digestible than those of animal foods. Cooking improves the digestibility of several foods.

Thus the nutritive value of a protein depends on its essential amino-acid make-up and its digestibility. The overall value of a protein can be determined with laboratory animals like rats as follows:—

(*a*) The gain in weight of young animals per unit weight of protein consumed is measured, and the value thus obtained is known as the "protein efficiency ratio".

(*b*) The amounts of nitrogen in the diet and in the excreta of adult animals are measured, and the percentage of the nitrogen retained by the animal from out of the nitrogen absorbed from the diet calculated. The value thus obtained is known as the "biological value" of the protein.

Data on the protein efficiency ratios and the biological values of some dietary proteins are given in Table 1.

TABLE 1

Nutritive value of the proteins of some foodstuffs.

Foodstuff	Biological value	Protein efficiency ratio
Rice	68	2.2
Wheat	65	1.5
Maize	59	1.2
Bengal gram	68	1.7
Red gram	57	1.5
Groundnut	55	1.7
Gingelly seeds ..	62	1.8
Egg	94	3.9
Milk	84	3.1
Meat	74	2.3
Fish	76	3.5

It will be seen from the above table that animal proteins are of higher biological value than vegetable foods are. This means that as single sources of proteins, animal foods such as milk, egg etc., are better than vegetable foods. But diets are usually made up of a mixture of foods. The nutritive value of a mixture of two proteins need not be merely the arithmetic mean of the individual values but something more because of the mutual supplementary effect of the component amino-acids. Thus, the protein value of foods, even solely of vegetable origin, can be enhanced by appropriate combinations. It has, in fact, been shown that the protein value of cereals can be improved by the addition of pulses and leafy vegetables.

According to modern concepts the daily protein needs of an adult are adequately met if the diet provides about one gram of protein per kilogram of body weight. It is to be expected that growing children require more protein per unit body weight than do adults because the new tissues which are being laid down during growth are largely built up of elements drawn from protein. Likewise, the protein needs of women are also greater during pregnancy and lactation than at other times.

The protein allowances suggested as a guide for practical nutrition work are given on page 27. For growing children and for women during pregnancy and lactation, the protein requirements are relatively greater and it is desirable that some animal foods which have protein of high nutritive value are included in the diet of these groups of population.

The best source of animal protein for growing children is milk. Skimmed milk is as rich in good quality protein as is whole milk, and buttermilk of good quality is also a useful source of protein. In devising cheap well-balanced diets in India, economic considerations often preclude the inclusion of milk

or other animal foods in adequate amounts. As discussed earlier a judicious mixture of vegetable foods like cereals and pulses can be cheap and at the same time can provide nearly as good an amino-acid pattern as that of the costly animal foods.

Fats

Like protein, fat is a necessary ingredient in the diet and it is of value to the body in a number of ways. Animal fats such as butter and ghee contain vitamin A, but the vitamin is lost to varying degrees during the process of cooking. Hydrogenated oil (Vanaspati), now popular in India as a cooking medium, does not normally contain vitamins. However, under Government regulations the vanaspati that is sold in the market should contain 700 International Units of added vitamin A per ounce, and most manufacturers add, in addition, 50 International Units of vitamin D per ounce of vanaspati.

Fat is a concentrated source of energy and it supplies per unit weight more than double the energy furnished by either protein or carbohydrate. Some fats, especially vegetable oils, provide what are called "essential fatty acids" —linoleic, linolenic and arachidonic acids—to the body. Like vitamins, the essential fatty acids also play a role in several metabolic reactions, and a deficiency of these acids in the diet leads to a skin condition known as phrynoderma (toad skin) in which skin becomes rough, and thick horny papules of the size of a pin-head erupt in certain areas of the body, notably thighs, buttocks, arms and trunk.

The fat content of a normal diet is made up mostly of the pure fats and oils consumed as such. However, the foodstuffs that are rich in fat are oilseeds and nuts, soyabean and avocado pear. Cereals, pulses and vegetables contain negligible amounts of fat.

In recent years, there has been a revival of interest in the nutritional aspects of fats in view of their role in influencing the levels of a substance known as cholesterol in the blood. The presence of excessive amounts of cholesterol in blood causes laying down of the substance under the lining of the blood vessels leading to a condition known as atherosclerosis in which the blood vessels are narrowed and hardened. The coronary arteries supplying blood to the heart are thus affected and coronary heart disease results. Extensive observations on population groups have shown that consumption of diets in which fats supply more than 30 per cent of the calories in the diet may result in an increase in blood cholesterol. While this may be true with persons leading a sedentary life, physical activity and vigorous exercise appear to help persons to tolerate higher levels of fat in the diet without much increase in the blood cholesterol.

Apart from the quantity of fat, the quality of fat in the diet also determines blood cholesterol levels. Some fats like groundnut oil, sesame oil or safflower oil which contain a high proportion of polyunsaturated fatty acids do not increase blood cholesterol levels very much even when consumed in

large quantities. On the other hand, certain fats like butter, ghee, coconut oil and hydrogenated vegetable fats (vanaspati) which contain a high proportion of saturated fatty acids have been shown to cause considerable elevation in the levels of blood cholesterol when consumed in large amounts. In the process of hydrogenation of groundnut oil or cotton seed oil, a good portion of the unsaturated fatty acids are converted to the saturated type. The consumption of unsaturated fats like gingelly oil or safflower oil along with saturated fat in a diet can help in minimising the effects of the latter in raising the blood cholesterol.

In addition to the quantity and quality, the mode of consumption of fat also appears to influence the cholesterol content of blood. At the same total daily intake, consumption of smaller amounts of fat a number of times during the course of the day has been shown to cause less elevation of cholesterol content as compared to consumption of large amounts of fat at a time.

The quantity of fat that should be included in a well-balanced diet is not known with any degree of certainty. However, it appears desirable in the present state of knowledge that the daily intake of fat should be such that it contributes not more than 15 to 20 per cent of the calories in the diet. A total of about 40 to 60 gms. of fat can therefore be safely consumed daily, and in order to obtain the necessary amounts of essential fatty acids, the fat intake should include at least 15 gms. of vegetable oils.

Carbohydrates

Carbohydrates are a class of substances which include glucose, cane sugar, milk-sugar, starch, etc. Grain foods are largely composed of starch, and foodstuffs like cane sugar and glucose are pure carbohydrates. They form the main source of energy to the body. Being a cheap source of energy, carbohydrates form the bulk of an Indian diet.

Besides starch and other digestible carbohydrates mentioned above, many foods contain celluloses and hemicelluloses which are also carbohydrates. These types of carbohydrates, also called "fibre" or "roughage", however, are not digested in the human digestive system and are voided as such. Though contributing little to the nutritive value of foods, the presence of roughage in the diet is necessary to the mechanics of digestion and elimination of wastes. The contraction of the muscular walls of the digestive organs is stimulated by the fibre, thus counteracting the tendency to constipation. Vegetables, particularly the leafy ones, fruits and condiments and spices are comparatively rich in fibre, while cereals, root vegetables and other foods are relatively poor sources.

In working out diet schedules, the requirements of protein, fat, vitamins and minerals should be first considered and carbohydrate-rich foods can then be included in the diet in sufficient amounts to meet the energy needs.

Energy Requirements

The consideration of the energy-yielding principles– proteins, fats and carbohydrates—in the preceding pages naturally leads us to the question of energy requirements. It is well known that even when the body is at rest, it expends a certain amount of energy for essential functions such as respiration, blood circulation, digestion, absorption and excretion, maintenance of body temperature, etc. The amount of energy thus expended when the body is at complete rest (both mentally and physically) is termed Basal Metabolism. Age, sex, height, weight and state of nutrition of an individual are some of the factors which influence it. The basal metabolism for a given age, sex and size is taken as the starting point for the calculation of the total energy requirement of individuals. Manual work, light or heavy, calls for an additional supply of energy. The energy needed for both basal metabolism and for muscular activity will have to be supplied through food.

In drawing up new diet schedules or in assessing the value of existing ones, the question is often posed whether greater importance should be attached to the question of quantity or quality. Naturally, ensuring both is obviously the most desirable. But where a priority is inevitable, the question of *enough food* should take precedence over quality and other considerations. It is comparatively easy to decide whether or not enough is being provided because in the absence of enough food, complaints of hunger can reasonably be expected. Unfortunately, experience has shown that human beings can adapt themselves, at a low level of vitality and with their powers impaired, to an insufficient ration without realising that they are underfed. The nutrition worker, in setting up standards of food requirements ignores, and justifiably too, the remarkable faculty of the body to adapt itself to mild degrees of starvation. He aims at not mere survival but positive health with all the faculties at a high level of working efficiency.

Quantitative food requirements are usually estimated in terms of heat units—calories*. A physiological calorie (also called Kilocalorie and abbreviated Kcal) is the amount of heat necessary to raise the temperature of one

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* A recommendation was made recently by International organizations like the FAO, WHO and the International Union of Nutritional Sciences that the unit 'joule' should be used instead of calorie for expression of energy values. The new units Kilojoule (KJ) and Megajoule (MJ) may, therefore, eventually replace the kilocalorie used now for expressing the energy value of foodstuffs. The relationship between the two units is as follows :

1 Kilocalorie (physiological calorie)	— 4.184 kilojoules (KJ) or 4,184 joules
1000 Kilocalories	— 4.184 Megajoules (MJ)

For practical nutrition work, however, it is suggested that the factor 4.2 can be used for conversion of Kilocalories to Kilojoules.

kilogram of water by one degree centigrade, and this heat unit is different from the physical heat unit which is one-thousandth of the physiological calorie. Wherever calorie is mentioned in this book, it is only the physiological or the large calorie and not the physical calorie.

The energy value of a foodstuff can be determined by employing an instrument called 'Bomb calorimeter', or it can be more easily calculated from the analysis of foods for protein, fat and carbohydrate and by multiplication of the values with the appropriate factors. One gram of carbohydrate or protein yields 4 calories while one gram of fat yields 9 calories.

As pointed out earlier, the total energy requirement of an individual is made up of two main components—(*a*) the basal energy required for such vital functions as respiration, circulation, etc. and (*b*) the energy required for the actual physical activities of the individual. It is the latter component that varies depending on the type of occupation of the individual and based on actual measurements, it has been found that activities such as writing, typing, etc., may be classified as light work; walking, shoemaking, etc., as moderate work and carrying heavy loads, woodcutting, stone-cutting, etc. as heavy work.

The actual calorie allowances for Indians as suggested by the Nutrition Expert Group of the Indian Council of Medical Research are set out in the table on page 27.

Practical nutrition work often involves the assessment of the calorie needs of groups of persons. In such cases, it is usual to assess the needs of women and children in terms of those of the average man by applying various co-efficients to the different age and sex groups. In the following scale which is suggested for practical nutrition work in India, the calorie consumption of an average adult male doing sedentary work is taken as one unit and the other co-efficients are worked out on the basis of the calorie requirements.

Adult male (sedentary worker)	..	1.0
Adult male (moderate worker)	..	1.2
Adult male (heavy worker) ..	..	1.6
Adult female (sedentary worker)	..	0.8
Adult female (moderate worker)	..	0.9
Adult female (heavy worker) ..	..	1.2
Adolescents—12 to 21 years	..	1.0
Children—9 to 12 years ..	..	0.8
Children—7 to 9 years ..	..	0.7
Children—5 to 7 years ..	..	0.6
Children—3 to 5 years ..	..	0.5
Children—1 to 3 years ..	..	0.4

It must be emphasized that this scale of co-efficients is a somewhat arbitrary one, and concerns only calories. It is not meant to be applied in assessing the needs for other nutrients.

It can be seen from the table on recommended dietary allowances (page 27 that the calorie requirements of a woman are lower than those of a man of corresponding age. During pregnancy and lactation, however, the needs of a woman are more and they may equal or even exceed the needs of a man because of the additional need to nourish the child in the womb or at breast.

With the help of the food composition tables, the calorie content of diets can be worked out and compared with the suggested requirements: or diet schedules yielding approximately the right amount of calories can be constructed. In dealing with a group of mixed age and sex composition, the number of "consumption units" (or "adult man value") in the group is first calculated. For example, a family consisting of father doing sedentary work, mother and three children age 10, 8 and 6 years has an "adult man value" or consumption units (calculated on the above scale) of 3.9 (i.e. 1.0+0.8+0.8+0.7+0.6) and the minimum daily calorie requirement of the family would be 2,400 × 3.9 or approximately 9,400 calories. If it is necessary to draw up a diet schedule for the family, foods supplying approximately 9,400 calories should be provided. If analysis of the existing diet of the family indicates that total calorie intake per day is below this level, attempts should be made to make good the deficiency.

Sound commonsense must be exercised in drawing up either new diet schedules, or in assessing the adequacy of existing ones. It is safer to err on the side of excess by 100 or 200 calories to allow for waste of all kinds. Standards of calorie requirements are applicable only to reasonably large number of people and not to individuals. The relation between calorie requirements and such factors as work, activity, age and climate (the hotter the climate, the less being the number of calories required) should also be borne in mind.

Vitamins

Vitamins are organic substances present in small amounts in several foodstuffs. They have important functions in many of the vital processes of life. They are, therefore, esssential for health and welf-being although they are needed only in small amounts. Vitamins are commonly named by the letters of the alphabet, A, B, C, D, etc., and are also referred to by the major functions they perform—for example, as anti-xerophthalmic, antineuritic, anti-scorbutic, anti-rachitic vitamins. With the availability of knowledge about the chemical nature of most vitamins, they are now being referred to in a majority of cases by names relating to their chemical structures as for example, thiamine, riboflavin, etc.

Based on their solubility, vitamins are broadly divided as water-soluble and fat-soluble vitamins. Vitamins A, D, E and K belong to the fat-soluble group and vitamins of the B complex and vitamin C belong to the group of water-soluble vitamins. In the brief discussion of vitamins in the following pages, the alphabetical order is followed.

Vitamin A

Vitamin A is necessary to keep the several epithelial tissues in the body ntact. In the absence of adequate intake of the vitamin, the outer lining of the eye ball loses its usual moist white appearance and becomes dry and wrinkled. Redness and inflammation of the eye and gradual loss of vision, may follow. The central portion of the eye (cornea) may lose its transparency and become opaque and soft, and if not treated in time may lead to total blindness. Vitamin A is also necessary to enable clear vision in dim light.

A skin condition known as phrynoderma (page 7) was once thought to be due to the deficiency of vitamin A, but it is now well established that it is due to the deficiency of essential fatty acids in the diet.

Vitamin A is present in some animal foods like butter and ghee, whole milk, curds, egg-yolk, liver etc. The liver oils of certain fish like cod, halibut, shark and saw-fish are some of the richest known natural sources of the vitamin. Vitamin A is not present as such in vegetable foods, but these foods contain substances known as carotenes which are converted into vitamin A in the body. Carotene, therefore, is also known as provitamin A. The word carotene has its origin in the fact that the pigment was first isolated from carrots. The chemical structure of the most widely distributed carotene, β-carotene, is such that on a unit weight basis it can yield equal amount of vitamin A. But in practice, however, this does not happen. While vitamin A as such is easily assimilable, carotene is less completely absorbed and less efficiently converted to vitamin A. The utilization of carotene in the diet depends on a number of factors. For instance, depending on the fat content of the diet, the absorption of carotene has been reported to vary from 25-50 per cent. Since most of the vitamin A requirement of an Indian is met from vegetable sources, it is usual to recommend a larger allowance of vitamin A in such diets to account for the incomplete physiological availability of vitamin A from such diets. Leafy vegetables such as spinach, amaranth leaves, coriander leaves, drumstick leaves, curry leaves, mint, radish leaves, etc., as well as ripe fruits such as mangoes, papaya and tomatoes are rich in carotene. Among other vegetables, carrots and yellow pumpkin are good sources. It can be said that in general the greener the leafy vegetable, the higher would be the carotene content, and consequently the outer dark-green leaves of cabbage are richer in carotene than are the inner white leaves.

It may be mentioned that the daily requirements of an adult are in the neighbourhood of 750 μg(about2,500 International Units) of vitamin A derived either from foods of animal or of vegetable origin. The requirements are greater in pregnancy and lactation and during growth. Animal foods rich in vitamin A are more expensive, and therefore the easiest and cheapest way of ensuring a sufficiency of vitamin A is to increase the intake of green leafy vegetables. About 50 gms. of the common leafy vegetables a day will furnish adequate amounts of this vitamin for adults as well as for children. But in the case of infants and young children and sickly and malnourished children

of all ages, who cannot properly digest the fibrous leafy vegetables, it is advisable to supply vitamin A from foods such as butter, liver, egg., etc., in which it is present as such. Vitamin A can also be given in the form of a daily dose of cod or shark liver oil or medicinal concentrates manufactured from such liver oils.

It is relevant at this stage to say a few words about the shark liver oil industry in India. In the past, the only source of vitamin A for treatment of deficiency cases were the Norwegian cod liver oil and concentrates manufactured from halibut liver oil. During the Second World War, the imports of cod liver oil were completely stopped. The country was, however, fortunate to find alternate sources in the liver oils of the shark and saw-fish that abound in the Indian coastal waters. The alternative was found to be even more potent in vitamin A than the imported cod liver oil. It is somewhat strange that shark and saw-fish are found extensively in the coastal waters of the Arabian Sea and the Indian Ocean and that they are somewhat rare along the eastern coast. In most hospitals and boarding schools in India, fish liver oil preparations derived from shark and saw-fish are being extensively supplied as a supplement. It should be mentioned in this connection that the supply of fish liver oils in welfare centres to infants and pregnant and nursing women is only a part of the nutritional care of such segments of the population. Adequate intake of other nutritious foods, wherever possible, is necessary in addition to this, and this fact must be explained and brought home to the beneficiaries by those who are in charge of such welfare centres.

In addition to the natural source of vitamin A, a synthetic product also is available. A factory for the production of synthetic vitamin A from Indian lemongrass oil has also recently been established in the country, and the product has found large use in therapy and in meeting the needs of the food fortification industry.

The vitamin A activity of any given foodstuff is variable, and it depends on a number of factors. The vitamin A potency of milk or butter, for example, depends on the carotene content of the grass which the cow consumes. It has been observed in Europe that "summer milk" obtained from cows fed on succulent green grass rich in carotene contains more vitamin A than does "winter milk". The vitamin A content of different samples of butter may vary from 600 to 6,000 International Units per 100 grams, and in the manufacture of ghee from butter by the methods used in Indian homes, some 25 percent of the vitamin A originally present may be destroyed and prolonged heating of ghee in an open pan causes further destruction of the vitamin. Cow ghee is richer in vitamin A than is buffalo ghee. Buffalo ghee is practically devoid of carotene and contains only preformed vitamin A; the yellow colour of cow ghee is due to the presence of carotene which may constitute nearly a third of the total vitamin A activity. Genuine cow ghee may contain about 20-25 International Units of vitamin A activity per gram while buffalo ghee contains about 8 to 10 International Units.

Vitamin A is somewhat more stable than carotene. Light, particularly ultraviolet rays, and air have a destructive influence on vitamin A. However, ordinary cooking of vegetables causes negligible losses in the carotene content. Fresh green vegetables invariably contain more catrotene than do stale ones.

Intake of large amounts of vitamin A over prolonged periods can lead to toxic symptoms which include irritability, headache, nausea and characteristic forceful vomiting. The symptoms, however, subside on stoppage of the intake.

B Vitamins

There are many vitamins grouped under B-vitamins; but only those whose importance in human nutrition has been well established will be discussed below.

Thiamine

Vitamin B_1, or "thiamine" as it is more commonly referred to now, was formerly known also as the "anti-beriberi" or "anti-neuritic" vitamin. It is an important member of the B group of vitamins and is the first of the vitamins to be discovered. Prolonged deficiency of thiamine in the diet of the humans is one of the main factors in the causation of the disease called beri-beri which may manifest in one of two forms. In the "dry beri-beri", there is a loss of appetite, tingling and numbness in the legs and hands and a dropping of the feet, while in "wet beri-beri" there is dropsy, palpitation and breathlessness and weakness of heart muscle leading to heart failure. Physiologically, thiamine is concerned with the proper utilisation of carbohydrates in the body and in the absence of adequate amounts of thiamine full utilisation of sugars and starches for energy needs is adversely affected.

Yeast and the outer layers of rice, wheat and other cereals have a high thiamine content. Among the commonly used foods the richest sources of thiamine are unmilled cereals, pulses, and nuts, particularly groundnut. Meat, fish, eggs, vegetables, fruits and milk are relatively poor in the vitamin. Removal of the outer bran layers of grains results in removal of thiamine and therefore diets largely composed of raw milled rice contain insufficient thiamine and hence may cause beri-beri. This disease used to be common in certain parts of India, especially in the coastal districts of Andhra Pradesh, because the diet consumed in these areas used to consist mainly of highly polished rice. In recent years, however, the incidence does not appear to be so widespread, probably because of a diversification in the diet consumed now.

The thiamine requirement of an individual depends on a number of factors among which the composition of the diet is one. Since thiamine is essentially concerned in the utilisation of carbohydrates, the need for thiamine increases when the proportion of carbohydrates in the diet is high as in the case of most Indian diets. Conversely, presence of fat in the diet reduces the need for the vitamin and that is why fat is said to have a thiamine-sparing action. Heavy-work and strenuous exercise and also physiological stresses like pregnancy and

lactation increase the calorie needs and consequently the thiamine needs also. While the thiamine requirements of infants and children have not been carefully evaluated with enough experimental support, the thiamine needs of school children and adults living on ordinary diets in normal circumstances may be placed at approximately one milligram a day. The requirement is usually expressed in terms of calorie intake, and it is about 0.5 mg. of the vitamin per 1,000 calories, subject to a minimum of one milligram per day. It is not difficult to plan a diet containing enough thiamine. Diets based on whole wheat, any of the millets, raw hand-pounded rice or parboiled rice (hand-pounded or machine milled) usually supply thiamine in sufficient amounts. The greatest danger of thiamine deficiency arises when highly milled raw rice is consumed as the main ingredient in a diet with practically negligible amounts of other thiamine-rich foods such as pulses. Even with a diet based on raw milled rice, beri-beri and other manifestations of thiamine deficiency can be avoided if about 80 grams of pulses are taken daily. The smaller the supply of non-cereal foods, the more important it becomes to avoid a preponderance of milled raw rice in the diets. An easy and effective means of preventing thiamine deficiency is to have recourse either to parboiled rice or under-milled raw rice or to partial replacement of the highly milled raw rice by any of the millets to the extent of about 100 grams per day.

It may be of interest to mention in this connection that recent investigations on the composition of human milk in some rice-eating areas in the country have shown that the thiamine content of such milk is poor as compared to that of the milk of mothers in the advanced countries. Supplementation of the mother's diet with the vitamin brings about an increase in the concentration of the vitamin in the milk also. Thus the deficiency of thiamine in the diet affects not only the adults but may have repercussions also in the nutrition of the breast-fed infant.

B_2-Complex Vitamins

Besides thiamine, there are several other members of the B group of vitamins which are referred to as "B_2-complex". They include riboflavin, nicotinic acid (niacin), pantothenic acid, pyridoxine, folic acid, vitamin B_{12}, choline, inositol and biotin. Recent investigations have shown that some of them are of great importance in human nutrition while others are of importance only in animal, poultry and microbial nutrition. The deficiencies of some of these vitamins frequently overlap and hence in clinical practice it is customary to treat cases presenting one or more of these deficiencies with a mixture of the B-complex vitamins than with individual vitamins, unless treatment with single vitamins in large doses is specifically indicated.

Riboflavin

Riboflavin is concerned with several oxidation processes inside the cell. Some of the symptoms usually attributed to an inadequate supply of this vitamin in the diet are soreness of the tongue, cracking at the angles of the

mouth, redness of the eyes, burning sensation in the eyes and scaliness of the skin in the region between the nose and the angles of the lips. Scrotal dermatitis can also be a result of riboflavin deficiency.

Good sources of the vitamin are milk and milk products (including skimmed milk, butter milk, curds, cheese and whey), eggs, liver and green leafy vegetables. Wheat, millets and pulses are fair sources of riboflavin, but rice is a particularly poor source.

The requirement of the vitamin has not been determined with any certainty; but the figure usually reported is around 1.5 mg. per day, and there is good evidence that poor Indian diets, which contain little milk or meat, are often very deficient in riboflavin.

Nicotinic acid

Nicotinic acid (also called niacin) is a vitamin intimately concerned in several metabolic reactions. Lack of the vitamin in the diet causes a disease known as pellagra which is characterised by soreness of the tongue, pigmented scaly skin and diarrhoea. The dermatitis appears most often over areas of skin which are exposed to sun,such as the back of the hands and feet, and generally it is symmetrically distributed in the body. The amino-acid tryptophan found in most good quality proteins is converted to nicotinic acid in the body, and hence it is capable of meeting the nicotinic acid requirements to a certain extent. In the assessment of the value of a foodstuff as a source of nicotinic acid it is therefore necessary to take into account the tryptophan content of the food also in order to obtain the value for what is known as "niacin equivalent". In countries such as America and Mexico where some population groups used to consume maize as the main cereal with no other adequate supplements, pellagra was commonly seen because maize is a poor source of nicotinic acid and tryptophan. Moreover a part of the nicotinic acid present in maize is stated to be not easily available physiologically. In India, pellagra has been observed in areas where jowar (*Sorghum vulgare*) is the main cereal consumed. This is attributed to the presence of excessive amounts of the amino acid leucine in the protein of jowar and to the resultant imbalance between leucine and the other essential amino acids, particularly isoleucine.

Whole cereals, pulses, nuts and meat are good sources of nicotinic acid, and groundnut is particularly rich in this vitamin. Although poor in nicotinic acid content, milk is also effective in preventing pellagra because of its richness in tryptophan. The requirements for the vitamin have been placed at approximately 10 mg. per day in diets which are otherwise adequate in respect of tryptophan. In terms of niacin equivalents, the requirement for an adult is about 16 mg. (*i.e.* 6.6 mg. per 1,000 Cals).

Vitamin B_6

This vitamin exists in three forms—pyridoxal, pyridoxamine, and pyridoxine—which are mutually interchangeable in the body.

Some important metabolic functions have been ascribed to this vitamin. Vitamin B_6 is required for the conversion of tryptophan to nicotinic acid in the body, and it is also associated with the metabolism of essential fatty acids. Although vitamin B_6 deficiency symptoms in humans have not been clearly defined, some types of angular stomatitis (cracking at the angles of the lips) and certain types of anaemia have been shown to be cured by administration of vitamin B_6. Inadequate intake of the vitamin in the case of infants has been reported to cause convulsions. The need for the vitamin in humans has thus been fairly established.

There are very few figures for the content of this vitamin in foods, and the available information shows that meat, liver, vegetables and whole cereal grains are good sources of vitamin B_6.

Pantothenic acid

The human requirement for this vitamin has not been clearly defined, but it is reported to be of value in curing a syndrome characterised by "burning feet" and sore tongue. The vitamin appears to be widely distributed in all foods.

Folic acid

Folic acid is involved in the multiplication and maturation of cells, and its deficiency results in certain types of anaemia especially in infants and in pregnant women. Fresh green vegetables, liver and pulses are good sources of the vitamin. The actual requirement for the vitamin has, however, not been defined with certainty, but is believed to be about 100 μg per day.

Vitamin B_{12}

Like folic acid, vitamin B_{12} is also involved in the maturation of cells, and a deficiency of this vitamin also results in certain types of anaemia. The vitamin also appears to be needed for the proper functioning of the central nervous system and for the proper utilization of food for body building purposes. Only animal foods like milk, meat and liver appear to contain vitamin B_{12} and hence people subsisting mainly on vegetable foods are prone to suffer from a deficiency of vitamin B_{12}. However, frank deficiency conditions like pernicious anaemia involving central nervous system are rarely seen in India. The requirement for vitamin B_{12} by man has not been defined accurately yet, but it appears to be small.

VITAMIN C

Vitamin C (ascorbic acid) is the vitamin that prevents a condition called scurvy. It is usually found in fresh fruits and vegetables, particularly the green leafy varieties. Of all the vitamins, vitamin C is the one vitamin that is most easily susceptible to destruction by atmospheric oxidation. One of its characteristic properties is its intense reducing action and hence the tendency to

rapidly oxidise in air. It is for this reason that when vegetables become dry and stale, most of the vitamin C originally present in them is destroyed.

Fresh meat and milk contain only small quantities of vitamin C. Dry pulses also normally do not contain vitamin C but when they are allowed to sprout or germinate, the vitamin is formed in the grain and in the growing sprouts. About 85 per cent of the vitamin would be present in the grain and 15 per cent in the shoot. Sprouting is a process involving soaking of the grains in water for about 24 hours and spreading them out on damp earth or damp blanket and covering them with a moist cloth. In two or three days, the grains germinate with half to three quarters of an inch of sprout. The germinated grain should be consumed either raw or after cooking for a minimum period. Usually during prolonged drought and consequent famine, scurvy is about the first deficiency disease to make its appearance because it would be difficult to provide adequate amounts of fruits and fresh vegetables in such situations. Sprouted grains may be used then as a cheap and easily available source of vitamin C, and the one commonly employed is sprouted Bengal gram (*Cicer arietinum*). Its efficacy in preventing scurvy has been demonstrated more than once in famine areas in India. Sprouted Bengal gram is by no means the best source of vitamin C among sprouted grains. Sprouted green gram (*Phaseolus radiatus*) contains about three times more vitamin C than does sprouted Bengal gram.

A very cheap and common fruit, namely, amla (*Phyllanthus emblica*) is very rich in vitamin C. Indeed it is one of the richest natural sources of the vitamin. Amla grows abundantly in all Indian forests and is obtainable in almost unlimited quantities in winter months. The fresh juice contains nearly twenty times as much vitamin C as orange juice, and a single fruit is equivalent in vitamin C content to one or two oranges.

Heating or drying of fresh fruits or vegetables usually leads to the destruction of most or all of the vitamin C originally present. Amla is, however, an exception among fruits not only because of its very high initial vitamin C content but also because it contains substances which partially protect the vitamin from destruction on heating and drying. Acidity has a protective action on vitamin C. Amla juice is very strongly acidic and hence it is possible to have amla preparations potent in vitamin C.

Scurvy is the drastic consequence of prolonged vitamin C deficiency, although in recent times the extreme manifestations of such total deficiency are rarely encountered. Vitamin C appears to be necessary also for the proper calcification of bones and teeth, and it facilitates absorption of iron by keeping the iron in the reduced form.

A well-balanced diet for school children and adults should contain some 30-50 mgs. of vitamin C per day. Since vitamin C is sensitive to heat, considerable loss occurs during cooking, especially if cooking is prolonged. Neverthe-

less, the inclusion of a few ounces of fresh fruits and leafy and other vegetables in a diet will ensure a satisfactory vitamin C intake. In the case of infants fed boiled fresh milk or reconstituted dried milk, special attention to vitamin C requirements is necessary. They should be given fruit juice in small quantities.

VITAMIN D

Vitamin D, the vitamin which prevents rickets and osteomalacia, is found in liver and liver oils, egg yolk and in milk and milk fat (butter and ghee) obtained from animals fed on green pastures and exposed to sunlight. Fish liver oil is its richest natural source. Common foods of vegetable origin do not contain vitamin D.

Vitamin D plays an important role in the absorption of calcium from the intestine and in the deposition of lime salt in the bone. Gross deformities of bones may therefore result if enough vitamin D is not made available to the body.

Vitamin D is also formed in the skin by the action of sunlight which transforms a substance normally present in the skin into the vitamin. Hence rickets generally does not occur among children exposed to sunlight, but is apt to occur in infants living in dark houses. Probably minor degrees of rickets are more common in infants and young children throughout India than is generally believed. Osteomalacia continues to be found frequently in the North among women observing purdah. The cheapest way of obtaining this vitamin is by exposure of the body to sunlight. Medicinal preparations of vitamin D cost money, while the sun is free.

Osteomalacia manifesting itself in the first instance by pain in the bones, usually starts during pregnancy, when demands for calcium are raised because of the needs of the growing foetus in the womb. After the child is born the disease may regress for a time, but it tends to recur in a more severe form in the succeeding pregnancies. Ultimately the bones of the unfortunate victim may become so bent that the woman is unable to stand upright, and the distortion of the pelvis may make it impossible for childbirth to take place normally. A good supply of vitamin D during pregnancy benefits the mother and helps in the satisfactory development of the infant. About 200 to 400 International Units of vitamin D are stated to be the daily requirements of a child. The requirements for adults may be less, but not known with any degree of certainty. One gram of the vitamin is equivalent to forty million International Units, and from this it would be apparent what small quantities of the vitamin are needed.

As in the case of vitamin A, intake of excessive amounts of vitamin D can lead to toxicity symptoms, which include irritability, nausea, vomiting and constipation. The margin of safety with vitamin D, however, appears to be much smaller as compared to vitamin A, and cases of toxicity in children have been reported even with prolonged daily intakes of as low a dose as 1,000 I. U.

Other Vitamins

Specific needs for the other vitamins like vitamins E and K for the humans have not been established. Vitamin E possesses antioxidant properties and is believed to have a role in preventing the oxidation of carotene and vitamin A in the digestive tract and also in keeping the rate of oxidation of foods inside the body on an even keel. Vitamin E is widely distributed in foods, especially in the oils of germs of cereals and in vegetable oils.

Vitamin K is necessary for proper clotting of blood and for prevention of bleeding, and has been found especially useful in the treatment of bleeding in new-born babies. Green leafy vegetables are rich sources of this vitamin.

Besides these vitamins, there are several other factors which have been claimed to possess vitamin activity. These factors, however, are not of sufficient importance in practical nutrition and hence are not discussed.

Mineral Salts

A large number of minerals are present in the human body. Bones and teeth are made up mainly of calcium, magnesium and phosphorus, and iron is an important constituent of blood. Iodine is necessary for the proper formation of the hormone thyroxine, and minerals like zinc, molybdenum and manganese are either constituents or activators of some enzymes. Sodium and potassium are important elements present in the extracellular and intracellular fluids respectively, and these elements along with other ions like chloride, carbonate and bicarbonate ions keep up the water balance and acid-base equilibrium in the body. On an average a man excretes daily about 20 to 30 gms. of mineral salts, consisting mostly of chlorides, sulphates and phosphates of sodium, potassium, magnesium and calcium and this output must be made good by the intake through foodstuffs. In the case of the growing body, provision must be made for additional amounts of many of the elements to ensure adequate growth of the tissues.

Calcium

The bones and teeth are made up principally of calcium salts and hence calcium is mainly required as a building material for strong bones and teeth. Calcium has many other functions also. Without calcium the contraction of the heart would not be proper, the muscles would not contract properly to make the limbs move, and the blood would not clot. Thus, calcium is an essential element for several life processes.

Calcium is found abundantly in milk (including skimmed milk and buttermilk), cheese and green leafy vegetables. Among the leafy vegetables, amaranth, fenugreek and drumstick leaves are particularly rich in calcium and among the root vegetables, tapioca is a good source. Most cereals contain some amounts of this element and the millet ragi is a particularly rich source

of calcium. Rice is very deficient in calcium, and therefore insufficiency of calcium is one of the most important defects of the rice eater's diet.

Children need relatively more calcium and other minerals than do adults to meet the needs of the growing bones. Expectant and nursing mothers also require higher amounts of calcium. A healthy breast-fed baby of three months contains a great deal of calcium in its bones, all of which has been drawn from its mother's blood and milk. If the mother's diet during this period is deficient in calcium, then the calcium present in her bones would be depleted, and her health, and probably that of the child also, will suffer. Since there is this enormous drain of calcium during pregnancy and lactation, adequate supply of the mineral is essential under these conditions. A large intake of milk and green leafy vegetables is therefore recommended during this period.

The calcium requirements in quantitative terms by man are not known with any degree of definiteness because there are no signs or symptoms ascribable directly to a deficiency of calcium. Moreover man appears to be capable of adapting himself to low intakes of calcium without any apparent deleterious effects. The recommendations for allowances for calcium should therefore be considered only tentative

The available information on the retention of calcium by the human body at different levels of intake has suggested the desirability of a daily intake of about 0.4 to 0.6 gm. of calcium by an adult. In the case of growing children and pregnant and lactating women, however, the Nutrition Expert Group of the Indian Council of Medical Research suggested a daily allowance of 1.0 g.m. This is because of the higher requirements under these conditions and also because of the fact that a part of the calcium in our cereal-based diets is apt to be unavailable because of the presence of phytin, a substance which is known to interfere with the absorption of calcium. Likewise, part of the calcium present in some leafy vegetables and oilseed cakes like gingelly cake may not be available due to its association with oxalic acid.

Certain foods rich in calcium are rich in oxalates too. These oxalates combine with calcium and form insoluble calcium oxalate and thus render the calcium unavailable to the body. The number of oxalate-rich foods is fortunately few. Gingelly seeds, spinach and amaranth are notably rich in oxalates. Tea and coffee are also rich in oxalates, but only small amounts of oxalates appear to pass into the infusion.

The habit of chewing betel leaves smeared with slaked lime (calcium hydroxide), a practice which is quite common throughout India (particularly among the poorer classes), increases the intake of calcium. Calcium ingested in this manner is utilised by the human body. The habit of chewing betel leaves several times in a day by expectant and nursing women in India has, therefore, some scientific sanction.

Phosphorus

Next in importance to calcium is phosphorus .The utilization of calcium in the body is closely related to that of phosphorus because most of the calcium is deposited in the body either in the bones or teeth as calcium phosphate. Phosphorus also plays an essential role in the assimilation of carbohydrates and fats.

Cereals, pulses, nuts and oilseeds are all rich in phosphorus. However, a large part of the phosphorus present in cereals, pulses and nuts is in combination as phytin which is not available to the human body. Further, phytin phosphorus interferes with the absorption of dietary calcium and iron.

It is usually stated that about one gram or more of phosphorus should be supplied in the diet daily. However, phosphorus deficiency is rarely encountered in Indian diets because the diets consumed by the population are predominantly based on cereals.

Iron

A well-balanced diet for growing child or for an adult should contain sufficient amount of iron to meet the iron requirements of the body and to allow for possible regional and seasonal variations in the iron content of foods. There appears to be considerable variation in the availability of iron from different foods. Furthermore, a part of the iron present in foods may be rendered unavailable to the body if in the diet there is excess of phytin phosphorus with which iron enters into a non-assimilable combination. The Nutrition Expert Group of the Indian Council of Medical Research considered the various aspects relating to the availability and utilization of food iron and recommended an allowance of 20 to 30 mg. of iron in a balanced diet for an adult.

Foodstuffs that are rich in iron are green leafy vegetables, and inclusion of about 50 gms. of this class of foods in the diet meets a considerable portion of the iron requirement. Of the cereal grains, millets, especially bajra and ragi, are good sources of iron. Milk, which is rich in many nutrients, is a particularly poor source of iron.

In the treatment of certain forms of anaemia (a condition in which the haemoglobin content of blood is low),medication with iron salts may be more effective than consumption of diets containing foods rich in iron. For the prevention of anaemia, however, a diet rich in iron would be valuable. It may be worth mentioning in this connection that pregnant women are particularly prone to suffer from anaemia.

OTHER ELEMENTS

Besides calcium, phosphorus and iron, a large number of other elements are also required for the normal well-being of man. Many of them are in fact

required only in trace amounts, although the exact requirements for most of these elements have not been defined clearly. An ordinary mixed diet is perhaps able to provide most of the trace elements to meet the requirements, and it is important to mention in this connection that apart from foodstuffs drinking water also provides some of the important elements such as iodine and fluorine, and possibly other elements also. It is difficult to judge the adequacy or otherwise of a diet with respect to the trace elements, but it is perhaps reasonable to suppose that if the requirements for the principal elements like calcium, phosphorus and iron are met in a diet, then the diet may be adequate with respect to most other elements also.

Although many elements are known to be present in tissues, their precise role in human nutrition is not known clearly with respect to many of them. The available information about some of the better understood elements is briefly summarized below:

Sodium and Potassium

Sodium and potassium are important constituents of fluids present outside and within the cells. A proper concentration of these elements in the body fluids is necessary to keep the cells in proper shape.

Sweat contains considerable amounts of sodium chloride, and to make good the loss through sweat and also to compensate the amount lost in urine, a readily available source of sodium and chloride, *viz.*, common salt, is included in the diet. When there is profuse perspiration as, for example, in summer or while working hard near boilers, in mines etc., it is advantageous to make good the loss of salts by taking a little extra salt with the drinking water or by adding it to the food.

Although there is some regional variation in the intake of common salt, an adult can be said to consume normally about 10 to 15 gms. of sodium chloride through the salt added to the diet. This amount of added salt by itself is so much that the amounts of sodium and chlorine present naturally in foodstuffs would have little practical significance under normal conditions. There are, however, certain diseases *e.g.*, high blood pressure, in which low-sodium diets are prescribed.

The normal requirements for potassium are not known, but most vegetable foods contain this element in adequate amounts. The potassium content of foods is often much higher than the sodium content.

Magnesium

Magnesium is present in small amounts in all tissues. Along with calcium it forms part of the bone substance, and it is required in small amounts for some biological reactions in the body.

Magnesium is an important component of chlorophyll, the green pigment found in vegetable foods.

Copper

The precise role of copper in human nutrition is not known, but it appears to be associated with the proper utilization of iron in the body.

Zinc

Although zinc is known for a long time to be an integral part of some of the important enzymes, its role in human nutrition has been realized only in recent times. Investigations with experimental animals showed that zinc deficiency causes impaired growth and also testicular degeneration in male animals. Some cases of dwarfism and hypogonadism (improper development of sex characteristics) seen in male teenagers in Egypt and Iran have also been shown to be due to zinc deficiency. The exact requirement of the mineral for man, however, is not known, nor accurate information is available regarding the zinc content of foods.

Iodine

The element iodine has been the subject of considerable study because goitre, a disease characterized by swelling of the thyroid gland in the neck and resulting from a deficiency of iodine, is prevalent in many parts of the world. The daily requirement for iodine has been reported to be about 100 to 150 μg, but most foodstuffs, with the exception of marine fish, are poor in iodine content. The iodine required by the body appears to be obtained mainly through the drinking water, and a low iodine content in drinking water, therefore, would be the main reason for iodine deficiency. In India the occurrence of goitre is confined mainly to the sub-Himalayan regions, and steps that are being taken to improve the iodine intake by persons in such goitre regions include fortification of common salt with iodine. The iodine-containing salts that are normally used for iodization of common salt are potassium iodide and potassium iodate, but under Indian conditions it has been observed that potassium iodate is the most suitable salt for iodization of common salt.

Fluorine

In some areas in Andhra Pradesh and the Punjab, the amount of flourine in drinking water is somewhat high (more than 2 or 3 p.p.m.). Continued consumption of such water leads to a disease known as fluorosis affecting teeth and bones. While ingestion of fluorine in excessive amounts produces these effects, some amount of flourine is necessary to prevent dental caries. Although it is usually stated that a flourine concentration of about 1 to 1.5 p. p. m. in water is ideal, skeletal fluorosis is seen in several areas in the Punjab even with a fluorine concentration of 1 p.p.m. in water. Moreover, since the intake of water in tropical countries like India is more, a safe limit lower than what is reported in the West is advisable, and under Indian conditions the ideal fluorine concentration in water would be around 0.8 p. p. m.

Dental caries is probably caused partly by the excessive consumption of sticky sweets and chocolates which may promote growth of bacteria that

affect oral hygiene and cause tooth decay. The habit of rinsing the mouth after each meal, as is widely prevalent among Indian communities, should be encouraged in children. This may go a long way in preventing dental caries.

Acid-base balance in foods

Foods are classified as acid-producing or alkali-producing depending on their effect on the urine. Calcium, magnesium, sodium and potassium present in foods contribute to the alkaline effect while sulphur, phosphorus and chlorine contribute to the acidic effect. Depending on the constituents which predominate, foodstuffs are classified as acid-producing or alkali-producing. Meat, fish, eggs, and most cereals are acid-producing while foods like milk and ragi (which are rich in calcium) and vegetables and fruits are alkali-producing. Some fruits like plums, prunes, etc., however, are acidic because of the special organic acids contained in them and which are, for the most part, excreted without being metabolised. The net acidic or basic effect of a food can be found by calculation from the mineral constituents described above. Available data on the net acid or alkaline effect of different foods are given in this book because such information may be of value at times for prescribing diets under certain diseased conditions.

Dietary Allowances

The preceding pages have provided an account of the importance of the different nutrients present in food. In order to prevent the ill-effects due to deficiency of particular nutrients and to sustain a vigorous and healthy life, it is necessary to know in quantitative terms the amounts of the different nutrients needed. Obviously, this need will vary with factors such as age, sex and type of work. A schedule of dietary allowances will have to meet at least the minimum nutritional needs of the majority of persons for whom it is applied and at the same time provide reasonable margin to allow for physiological non-availability of some nutrients from particular foods. Such a schedule will help a group of persons to select the proper foods to make up a diet that will provide the nutrients in the amounts indicated. Also, on a national level such allowances will be useful in enabling governments to plan their food production policies, to judge the adequacy or otherwise of the national supply of foods,and to point out the areas in which improvements are called for.

The Nutrition Advisory Committee of the Indian Research Fund Association, now Indian Council of Medical Research, formulated for the first time in 1944 a schedule of recommended dietary allowances. In view of the changed conditions at the end of the war and taking into account the increase in the available information on the subject as a result of researches carried out in India itself, the Committee decided in November 1958 to revise its recommendations with regard to calories and proteins, and another revision was made in March, 1968. The latest recommendations for dietary allowances dor Indians are given in Table 2.

Notes on Table 2.

1. The dietary allowances suggested for adults are for a reference man weighing 55 kg. and for a reference woman weighing 45 kg. The allowances for calories and proteins and for B-complex vitamins should be increased or cefcreased depending on the body weight.

2. The allowance for protein recommended by Nutrition Expert Group of Indian Council of Medical Research for adult is about 1 gm. per Kg. body weight per day and it is assumed that the dietary protein is derived from a mixture of vegetable foods.

Proteins of animal origin are superior in biological value as compared to vegetable proteins. However, it is possible to improve the biological value of vegetable proteins through a proper admixture of foodstuffs, and it is for this reason that it is not insisted that a certain proportion of the total protein should be derived from animal foods. For infants and children and for pregnant and nursing women, however, it is desirable to supply some part (about 25%) of the total protein from animal foods such as milk, egg, flesh foods, etc.

TABLE 2

Daily Allowances of Nutrients for Indians

(Recommended by the Nutrition Expert Group in 1968)

Group	Particulars	Calories	Proteins (gm.)	Calcium (gm.)	Iron (mg.)	Vitamin A: Retinol (μg.)	Vitamin A: or β-carotene (μg.)	Thiamine (mg.)	Riboflavin (mg.)	Nicotinic acid (mg.)	Ascorbic acid (mg.)	Folic aicd (μg.)	Vitamin B_{12} (μg.)	Vitamin D (I·U)
Man	Sedentary work	2400	55	0.4 to 0.5	20	750	3000	1.2	1.3	16	50	100	1	200
	Moderate work	2800						1.4	1.5	19				
	Heavy work	3900						2.0	2.2	26				
Woman	Sedentary work	1900	45	0.4 to 0.5	30	750	3000	1.0	1.0	13	50	100	1	
	Moderate work	2200						1.1	1.2	15				
	Heavy work	3000						1.5	1.7	20				
	Pregnancy (second half of pregnancy)	+300	+10	1.0	40	750	3000	+0.2	+0.2	+2	50	150-300	1.5	
	Lactation (up to 1 year)	+700	+20		30	1150	4600	+0.4	+0.4	+5	80	150		
Infants	0—6 months	120/kg.	2.3-1.8/kg.		1.0 mg /kg.	400	—				30	25	0.2	
	7—12 months	100/kg.	1.8-1.5/kg.	0.5-0.6		300	1200							
Children	1 year	1200	17	0.4 to 0.5	15-20	250	1000	0.6	0.7	8	30-50	50-100	0.5-1.0	
	2 years		18											
	3 years		20											
	4—6 years	1500	22			300	1200	0.8	0.8	10				
	7—9 years	1800	33			400	1600	0.9	1.0	12				
	10—12 years	2100	41			600	2400	1.0	1·2	14				
Adolescents	13–15 yrs. Boys	2500	55	0.6-0.7	25	750	3000	1.3	1.4	17				
	Girls	2200	50		35			1.1	1.2	14				
	16—18 yrs. Boys	3000	60	0.5-0.6	25	750	3000	1.5	1.7	21				
	Girls	2200	50		35			1.1	1.2	14				

3. The requirements for fats have not been indicated in the Table and the subject has been discussed in the text. It would appear to be unnecessary to have a fat intake which supplies more than 15% of the calories in the diet. About 15 gms. of vegetable oils, however, should be present in the diet to meet the essential fatty acid requirement.

4. Figures for carbohydrates are also not given in the Table; but about 70% of the calories in a diet can be from carbohydrates.

5. Most of the ingredients of a diet are rich in phosphorus, and it is for this reason the allowances for this element are not listed.

6. Minerals such as magnesium, copper, iodine, etc., are also essential in nutrition, but they are needed only in small amounts. Normally, if a diet is well-balanced and is adequate with reference to other nutrients, the requirements for these trace elements can be assumed to have been met.

7. Dietary allowances for vitamin A are given both in terms of retinol (performed vitamin A) and β carotene, and the required amounts of vitamin A can be obtained from either or both. Although by definition 1 mg. of β-carotene is equivalent to more than 0.5 mg. (1666 I. U.) of retinol, some studies indicate that for all practical purposes it may be taken as equivalent to 0.25 mg. of retinol because of the inefficiency of utilization of carotene as a source of vitamin A. The total vitamin A value of a diet in terms of retinol can be calculated as follows:—

$$\text{Total vitamin A value as Retinol}(\mu g) = \text{Retinol}(\mu g) + \frac{\beta \text{ carotene } (\mu g)}{4}$$

8. A part of the vitamin D requirement is undoubtedly met by the action of sunlight on the skin. However, it may not be advisable to rely entirely on sunshine for obtaining the vitamin D requirements, especially in the case of children.

9. The requirements for thiamine, riboflavin and nicotinic acid are related to calorie intake and the recommended allowances per 1,000 calories are: thiamine, 0.5 mg., riboflavin, 0.55 mg. and nicotinic acid, 6.6 mg. Nicotinic acid allowances include contribution from dietary tryptophan, 60 mg. of tryptophan being equivalent to 1 mg. of nicotinic acid.

Balanced Diets

In the preceding pages, the importance of the various nutrients in human nutrition has been considered. We shall now consider the planning of diets which would provide these essential nutrients in the needed amounts and proportions. A "balanced diet" is one which contains different types of foods in such quantities and proportions that the need for calories, minerals, vitamins and other nutrients is adequately met and a small provision is made for extra nutrients to withstand short durations of leanness. Taking into account the foods which commonly form part of the Indian diets, balanced diets have been suggested for various groups of population, and the composition of such diets is given in tables 3, 4, 5 and 6.

TABLE 3

Balanced Diets for Adult Man

	SEDENTARY WORK		MODERATE WORK		HEAVY WORK	
	Vegetarian (gm.)	Non-vegetarian (gm.)	Vegetarian (gm.)	Non-vegetarian (gm.)	Vegetarian (gm.)	Non-vegetarian (gm.)
Cereals	400	400	475	475	650	650
Pulses	70	55	80	65	80	65
Green leafy vegetables ..	100	100	125	125	125	125
Other vegetables	75	75	75	75	100	100
Roots and tubers	75	75	100	100	100	100
Fruits	30	30	30	30	30	30
Milk	200	100	200	100	200	100
Fats and oils	35	40	40	40	50	50
Meat and fish	..	30	..	30	..	30
Eggs	..	30	..	30	..	30
Sugar and jaggery	30	30	40	40	55	55
Groundnuts	..	..	..	..	50	50*

*An additional 30 gm. of fats and oils can be included in the diet in place of groundnuts.

TABLE 4

Balanced Diets for Adult Woman

	SEDENTARY WORK		MODERATE WORK		HEAVY WORK		ADDITIONAL ALLOWANCES DURING	
	Vegetarian	Non-vegetarian	Vegetarian	Non-vegetarian	Vegetarian	Non-vegetarian	Pregnancy	Lactation
	(gm.)	(gm.)	(gm.)	(gm.)	(gm.)	(gm.)	(gm.)	(gm.)
Cereals	300	300	350	350	475	475	50	100
Pulses	60	45	70	55	70	55	..	10
Green leafy vegetables	125	125	125	125	125	125	25	25
Other vegetables ..	75	75	75	75	100	100	..	..
Roots and tubers ..	50	50	75	75	100	100	..	..
Fruits	30	30	30	30	30	30	..	..
Milk	200	100	200	100	200	100	125	125
Fats and oils ..	30	35	35	40	40	45	..	15
Sugar and jaggery ..	30	30	30	30	40	40	10	20
Meat and fish ..	..	30	..	30	..	30	..	..
Eggs	..	30	..	30	..	30	..	..
Groundnuts ..	..	..	..	..	40*	40*	..	..

*An additional 25 gm. of fats and oils can be included in place of groundnuts.

TABLE 5

Balanced Diets for Children

	Pre-school Children				School Children			
	1–3 Years		4–6 Years		7–9 Years		10-12 Years	
	Vegetarian (gm.)	Non-vegetarian (gm.)	Vegetarian (gm.)	Non-vegetarian (gm.)	Vegetarian (gm.)	Non-vegetarian (gm.)	Vegetarian (gm.)	Non-vegetarian (gm.)
Cereals	150	150	200	200	250	250	320	320
Pulses	50	40	60	50	70	60	70	60
Green leafy vegetables	50	50	75	75	75	75	100	100
Other vegetables .. / Roots and tubers ..	30	30	50	50	50	50	75	75
Fruits	50	50	50	50	50	50	50	50
Milk	300	200	250	200	250	200	250	200
Fats and oils ..	20	20	25	25	30	30	35	35
Meat and fish / Eggs	..	30	..	30	..	30	..	30
Sugar and jaggery ..	30	30	40	40	50	50	50	50

TABLE 6

Balanced Diets for Adolescent Boys and Girls

	Boys				Girls'	
	13–15 years		16–18 years		13–18 years	
	Vegetarian	Non-vegetarian	Vegetarian	Non-vegetarian	Vegetarian	Non-vegetarian
	(gm.)	(gm.)	(gm.)	(gm.)	(gm.)	(gm.)
Cereals	430	430	450	450	350	350
Pulses	70	50	70	50	70	50
Green leafy vegetables ..	100	100	100	100	150	150
Other vegetables	75	75	75	75	75	75
Roots and tubers	75	75	100	100	75	75
Fruits	30	30	30	30	30	30
Milk	250	150	250	150	250	150
Fats and oils	35	40	45	50	35	40
Meat and fish	..	30	..	30	..	30
Eggs	..	30	..	30	..	30
Sugar and jaggery	30	30	40	40	30	30
Groundnuts	..	..	50*	50*	..	..

*An additional 30 gm. of fats and oils can be included in the diet in place of groundnuts.

Diets with the composition shown in the tables supply all the essential nutrients in adequate amounts and keep the majority of individuals consuming them in a state of good health. It may be pertinent then at this stage to consider how each class of foodstuffs suggested in the above diets supplies our daily requirement of the various nutrients.

Cereals

Rice, wheat and millets (jowar, bajra, ragi etc.,) are the main cereal grains consumed in India. They are the cheapest sources of calories and they contribute as much as 70 to 80% of the calories in the diets of a majority of population in our country. In view of the large amounts in which cereals are included in the diet, they form important sources of nutrients in an average Indian diet. Most cereal grains contain 6 to 12 per cent protein, and in general cereal proteins are somewhat deficient in the essential amino acid lysine which limits the protein quality. Rice protein, however, is richer in lysine compared to the other cereal proteins and for this reason rice protein is of better quality.

Most cereal grains are poor in mineral content, and rice is an especially poor source of two important minerals, calcium and iron, However, ragi is very rich in these minerals, especially calcium, and inclusion of this millet in adequate amounts in the diet will go a long way in making up the deficiencies of some of the minerals in the diet. Bajra is also a good source of iron.

Whole cereal grains are important sources of B-vitamins, especially thiamine and nicotinic acid. Since these vitamins are present in the cereal grain in the outer bran layers, the vitamin content of the finished product depends on the degree of removal of the outer layers. Particularly in the case of raw rice, the vitamin content decreases with the increase in the degree of milling and polishing given to the grain. Highly polished raw rice, therefore, has a very poor content of vitamins. Parboiled rice, on the other hand, contains significant amounts of thiamine because during the course of parboiling in which paddy is subjected to steaming or boiling in water, the vitamin seeps into the inner portions of the grain so that even if the grain is milled and polished, significant amounts of the vitamin are still retained in the grain.

Except yellow maize, which contains some amounts of carotene, cereal grains in general do not contain much vitamin A activity and vitamin C.

Pulses

Pulses (or legumes as they are also called) are rich in proteins. In diets in which flesh foods are present only in small amounts, pulses are therefore important as a source of protein. Pulse proteins, however, are of relatively low biological value because of the deficiency of the essential amino-acid methionine. Red gram is deficient in tryptophan also. However, pulse proteins are rich in lysine and they are therefore, of good supplementary value to cereal diets. The lysine deficit in cereals is made good by the lysine present in pulses and thus the overall biological value of cereal-pulse diets is better.

In the amounts consumed, pulses cannot be considered rich sources of minerals, but they are rich in B-vitamins, especially thiamine and folic acid. Dried pulses do not contain vitamin C in any significant amounts, but when they are germinated, significant amounts of vitamin C are elaborated so that sprouted pulses, especially sprouted green gram and Bengal gram become rich source of this vitamin.

Nuts and Oilseeds

Like pulses, nuts and oilseeds are also rich in proteins and in addition they contain fat so that they are rich in calories also. Most of the oilseeds produced in the country are used for extraction of edible oils, and the cake left behind is even richer in protein than the original seed. Oilseed cakes were not being used as human food to any significant extent till recently because the methods used so far for extraction of oil were not good enough to produce a wholesome cake. Also, with country "ghanis" the removal of oil is not complete, and the oil that is retained in the cake turns rancid in course of time and gives rise to off-flavours in addition to posing storage problems. However, improved extraction procedures followed in large mills in recent years have enabled the production of clean products practically free from off-flavours. The meal can be used as such in various ways as food for humans, and procedures are also available for production of "protein isolates" from the oil meals.

In common with other proteins of plant origin, oilseed proteins are also low in biological value because of a relative deficiency of the amino-acid methionine, and groundnut protein is particularly poor in methionine. Gingelly (sesame) protein, however, is relatively richer in this amino–acid, as also is sunflower seed protein.

Besides protein, oilseeds are rich sources of B-complex vitamins also. Groundnut especially is very rich in thiamine and in nicotinic acid.

Some work carried out in recent years in various parts of the world showed that many foodstuffs can become contaminated with fungi (moulds) if they are stored under humid and unhygienic conditions. Some of these fungi produce toxins which are positively deleterious to health. Groundnut is shown to be particularly prone to infestation with a fungus known as *Aspergillus flavus* which produces aflatoxin, and this toxin has been shown to cause damage to the liver in many experimental animals including monkeys. Only clean and wholesome groundnuts should, therefore, be used as food, and when dealing with the deoiled cake it should be seen to it that it does not contain aflatoxin in amounts above the accepted safe and permissible limits.

Green leafy vegetables

Many types of green leaves such as palak, amaranth, fenugreek leaves, drumstick leaves, mint etc., are consumed all over the country as vegetables, and most of them are rich sources of calcium, iron, carotene, vitamin C, riboflavin and folic acid. These vegetables are, therefore, inexpensive sources

of many nutrients which are essential for growth and maintenance of normal health. Deficiency of these nutrients is commonly seen in our country and steps should, therefore, be taken to encourage cultivation of green leafy vegetables in kitchen gardens and school gardens. Consumption of such vegetables in adequate amounts especially by pregnant and nursing women and by children should also be encouraged.

Root vegetables

Some of the important foodstuffs belonging to the group of root vegetables are tapioca, potato, sweet potato, carrots, yam and colocasia. They are all rich in carbohydrates and hence they yield mainly energy. Foods like carrots and yellow varieties of yam are also rich in carotene, and foods like potato contain significant amounts of vitamin C. Some root vegetables like tapioca, which is consumed commonly in Kerala, are such high yielders per acre of land that they have served as emergency or famine foods in times of cereal shortage.

Other vegetables

Other vegetables are those which do not fall under the category of leafy and root vegetables. Many such vegetables like brinjals (egg-plant), ladies fingers (okra), French beans, various gourds, etc., are consumed mainly to add variety to the diet. Some of them are also fair sources of vitamins and minerals.

Fruits

Fruits are in general good sources of vitamin C, and amla is an especially rich source of this vitamin. Yellow fruits like mango and papaya contain carotene in addition and dried fruits like dates and raisins are sources of iron. The commonly used banana is a fruit rich in carbohydrate, and it therefore yields energy also.

If green leafy vegetables are included in the diet in adequate amounts, the need for fruit as an essential item in the diet is much reduced.

Milk ond milk products

Milk is an ideal food for infants and children, and it is a good supplementary food for adults. It contains proteins of good quality and also other nutrients in proper proportion and it is thus a complete food. It is, however, deficient in vitamin C and in iron. With only minor exceptions, the overall nutritive value of milk of different species can be said to be similar. Human milk contains more lactose (milk sugar) and buffalo milk contains more fat as compared to cow's milk. Cow's milk contains more protein than does human milk. Unless the whey is thrown away, the products derived from milk retain most of the nutrients contained originally in milk. For example, curd, which is the form in which milk is consumed to a significant extent in India, is for all practical purposes the same in nutritive value as milk is.

The nutrient composition of dried milk (milk powder) is more or less the same as that of milk on a moisture-free basis.

The requirement for milk by persons of different age groups are given in the suggested balanced diets (p. 29 to 32). It may be noted that these amounts are low, but it should be pointed out that these low figures are suggested as practical levels in the context of the prevailing low per capita availability of milk in the country. It should be our aim in food planning to achieve a much higher figure than this. In the more advanced countries and also in some regions in our country, the daily intake of milk is nearly 600 ml. per person. Renewed and vigorous efforts should be made to increase the average level of milk consumption, and in the meantime the available milk should be channelized to meet the priority needs of infants, growing children and pregnant and nursing women.

Sugar and jaggery

Sugar and jaggery are used as sweetening agents in beverages and other foods to increase their palatability. They are mainly sources of energy although jaggery contains in addition, iron.

Fats and oils

The visible fats that enter the diet are fats such as butter and ghee and the various vegetable oils and sometimes also vanaspati made by hydrogenation of oils. Irrespective of the type, all fats and oils yield the same amount of energy. However, vegetable oils have necessarily to be included in the diet to the extent of 15 gms. per day to obtain the necessary amounts of essential fatty acids required by the body. Vegetable oils, especially safflower oil, are rich in polyunsaturated fatty acids.

Flesh foods

Flesh foods such as fish and meat are rich in proteins of high biological value and in B-vitamins. Especially vitamin B_{12} is contained only in foods of animal origin and not in plant foods. Flesh foods are generally not good sources of vitamin A, but liver, which is very rich in vitamin A, is an exception. Fish is a good source of calcium, especially the small varieties which are consumed whole.

Eggs

Egg is a rich source of all nutrients except vitamin C. The protein contained in egg is considered to be a perfect protein, and because of its high biological value and digestibility, egg protein is used in nutrition work as a reference protein for comparison with other proteins. Egg of different species of birds can be said to be similar in nutritive value. Raw egg-white, however, contains a protein known as avidin which renders the vitamin biotin unavailable to the body. Duck egg-white contains in addition a substance known as trypsin-inhibitor which inhibits the action of trypsin on protein. Heating

egg, as, for instance, in the preparation of boiled egg, destroys both avidin and the trypsin-inhibitor.

Condiments and spices

These are accessory foodstuffs mainly used for flavouring food preparations. Some of the condiments like chillies and coriander are good sources of carotene. Green chillies supply vitamin C, and turmeric and tamarind are fair sources of iron. However, because of the small amounts in which many of the condiments and spices are used, they do not add substantially to the nutritive value of the diet. Some spices like garlic and asafoetida are believed to contain active principles which inhibit the growth of putrefactive bacteria in the intestinal tract.

Effect of processing on nutritive value of foodstuffs

Nearly all foodstuffs, with the exception of fruits and some leafy vegetables used either as salads or in chutneys, are consumed after cooking. The nutritive value of any foodstuff should, strictly speaking, be assessed on the cooked material, the state in which it is consumed and not in its raw state. But culinary practices vary from province to province, district to district and even house to house. Further, reports of systematic investigation on the subject are meagre and hence only broad details are given.

Cooking involves one of the following processes—wet method of treatment like boiling and steaming, and dry methods of treatment like frying, roasting and baking. The wet methods of cooking lead to comparatively greater losses than the dry methods. The effect on the nutritive value of foodstuffs as a result of heating and cooking is, on the whole, less pronounced than is generally believed.

Ordinary cooking causes little loss of protein, fat and carbohydrates in cereals, pulses and meat. In vegetables, however, there may be some protein loss on boiling in water, particularly when salt is used in cooking and the cooking water discarded. If the cooking water is thrown away, there is considerable loss of mineral salts especially of sodium, potassium and chlorine due to leaching. It is therefore advisable either to use the minimum amount of water or to utilise the cooking liquor in either soups or gravies. Root vegetables do not suffer much loss in nutrients by either wet or dry methods of cooking because the skin of most root vegetables prevents leaching out of the nutrients. It is, therefore, preferable to boil them with their skins. Further it is not advisable to peel and cut the vegetables long before they are ready for boiling. They may be cut into as big pieces as possible, added immediately to water which has already been brought to boil and cooked for as short a time as possible. The cooking water can be made use of in the preparation of soups. Losses due to leaching are less if the vegetables are just steamed.

Certain amounts of minerals and vitamins are lost even during preliminary treatment of washing prior to cooking. It is a common practice for the house-

wife to wash rice three or four times with large amounts of water before cooking. Considerable amounts of minerals pass into the water, the proportion removed being greater than that removed by subsequent cooking. Rice of poor commercial quality naturally requires more washing than rice of good quality does and in the process there is a loss of minerals. The B vitamins, especially thiamine and nicotinic acid, are also lost to the extent of about 40 per cent. The rice "conjee" or the surplus liquor strained away after cooking rice, also carries with it a part of the vitamins. It may, however, be mentioned that conjee, though it carries a small portion of the vitamins and minerals contained in the original rice, is not as high in nutritive value as is generally believed. It will be a good practice to wash the rice only if necessary with the least quantity of water and cook it in just sufficient amount of water so that all the water is absorbed and no "conjee" is discarded.

More than the minerals, it is the vitamins, particularly the members of the water-soluble group, that show greater loss as a result of cooking. Vitamin A or carotene is not affected when foodstuffs are cooked in water. But in shallow frying or roasting there may be considerable loss of this vitamin. In the preparation of chips, etc., in which the vegetables are cut and fried immediately in hot deep fat for short time, the loss in vitamin A is perhaps not high.

The loss in thiamine due to cooking may be occasioned partly by destruction during cooking and partly by the dissolution of the vitamin in the cooking water. If excess water is used and the cooking water is discarded, a loss of as much as 50 per cent of the vitamin can occur. Further, if soda (sodium bicarbonate) is added, especially while cooking dhals or pulses to facilitate cooking or to preserve the colour of the dhal, most of the thiamine is destroyed.

Conversely, a substance like tamarind with high acidity, if added to cooking water, has a preservative effect on the vitamins. Especially vitamin C, which is water-soluble and is also easily oxidised, is lost through leaching in the boiling water and also during the interval between cooking and actual consumption. It may be preferable to cook leafy vegetables with the lid on with minimum exposure to air and in the minimum quantity of water. The sooner the preparation is consumed after cooking, the better it would be. Since in most houses a dish is rarely consumed immediately after cooking, it is desirable to include some raw fruit or vegetable in the diet as a source of vitamin C. Milk is a poor source of vitamin C, and a major portion of this vitamin is lost in boiling. Eggs appear to suffer little loss in nutritive value as a result of the conventional methods of cooking.

It has been reported recently on the basis of animal experiments that fats repeatedly used a number of times for frying become slightly toxic.

Cooking has several beneficial effects. It improves the appearance of several foods and confers new flavours to them and makes foods more appetising and palatable. Harmful disease-causing organisms present in foodstuffs

are killed as a result of cooking. The digestibility of several foods is improved by cooking. For instance, the starch present in foodgrains is surrounded by a tough cellulose wall. Mastication in the mouth is incapable of disrupting this wall and digestive juices cannot get access to the starch. When the grains are cooked, the heat causes the starch to swell and the cell-walls burst. Thus the starch and other nutrients within the foodgrains become more easily accessible to the digestive enzymes. Cooking makes meat softer and capable of being chewed. Biotin, a vitamin of the B group, is present in fair amounts in egg yolk but the white of egg contains a substance called avidin which is capable of inactivating biotin. When egg is cooked, avidin is completely destroyed so that biotin is made available to the body. Similarly, some pulses and legumes like soyabean and Bengal gram and duck's egg contain some substances which hinder the digestion of the proteins of these foods by the enzyme trypsin present in our intestines. During cooking, these trypsin-inhibitors are destroyed thus rendering the protein of these foods better digestible. The biological value of proteins in several foods improves as a result of moderate heating as in ordinary cooking.

Excessive heating of foodstuffs may, however, affect the nutritive value of the proteins adversely by rendering some of the amino-acids contained in the proteins unavailable to the body. Moreover, some sugars like glucose and lactose form complexes with some amino-acids, notably lysine, and these complexes are not acted upon by the protein-splitting enzymes in the digestive tract. Excessive and prolonged heating should therefore be avoided, especially when large quantities of substances like jaggery are used in the preparation. Browning that is usually observed in foodstuffs which are stored for prolonged periods is also due to the complexing of amino-acids with carbohydrates. Milk powder should especially be stored under moisture-free conditions, as otherwise browning may occur and the nutritional quality of the protein may suffer.

The use of iron knives for slicing vegetables and use of cast iron pans for frying has been shown to add to the iron content of the diet, though the extent to which such iron is physiologically available is not known.

Diets and thier improvement in practice

Diet surveys are usually carried out by house to house visits in which information about food consumption, the number of inmates in the family and their age and sex, monthly income of the family, etc., is collected. From the data thus obtained one can calculate the intake of nutrients by an adult unit in the family, and one can then suggest improvement in the diet if needed. However, attempts to improve the diets are likely to be limited by the income of the family, and if the ideal is not possible to be attained, whatever is economically feasible must be attempted. A wide choice of inexpensive foodstuffs is available in the country, and a judicious use of these foodstuffs will greatly help in correcting dietary inadequacies.

Extensive surveys have been carried out by various agencies all over the country, and the available data on the composition of the diets in the various regions of the country are given in the book "Diet Atlas of India" published by the National Institute of Nutrition, Hyderabad. It would be apparent from the data that because of the wide regional variations in the intake of different foodstuffs, it would be difficult to define in precise terms a typical Indian diet. Variations also exist in the intake of foodstuffs between rural and urban areas in the same region. However, it would be clear that the diets consumed in India are highly cereal-based. In the case of a majority of population, cereals form almost the bulk of the diet and constitute the major source, if not the only source, of nutrients, particularly in the case of people belonging to lower socio-economic groups. It is these diets that need improvement. A concrete example will illustrate the methods to be followed in improving diets and drawing up satisfactory diet schedules. Table 7 gives the diet of an adult as found in a diet survey, and the nutrient composition of the diet.

TABLE 7

Composition of an average diet and its approximate nutritive value

Foods	Amount (gms)	Nutrient	Amount
Cereals	540	Protein	57 gms.
Pulses	12	Fat	24 gms.
Leafy vegetables	7	Carbohydrate	490 gms.
Roots and tubers	7	Calories	2,400
Other vegetables	85	Calcium	360 mg.
Milk	80	Iron	24 mg.
Meat, fish & eggs	5	Vitamin A value	340 μg.
Oils and fats	15	Thiamine	0.7 mg.
Sugar & jaggery	13	Riboflavin	0.6 mg.
Fruits	5		

It will be apparent that this diet is insufficient in many respects. It fails to supply the nutrients in the required amounts and is thus ill-balanced. The nutritive value has been calculated on the assumption that the cereal intake is composed of a mixture of cereals. However, it is common knowledge that in most families only a single cereal is consumed. Further, though items like leafy vegetables and flesh foods and fruits are listed in the average diet given above, very few families consume these or the consumption may be occasional. If we take these facts into consideration, the nutritive value of the diet consumed in a good number of families constituting a majority of the population will be much worse than what is shown above.

An improvement is possible in this diet in almost every category of foodstuff. If means allow, the quantities of foodstuffs given for well-balanced diets would be the best substitute. But it will be realised that items like milk,

fruits and flesh foods are expensive and beyond the means of many. In these circumstances the question of cost should be borne in mind while attempting any improvement in the diet. Further, with the increasing population in the country, the production of certain foods (especially the foods which supply vitamins, proteins and minerals) has not kept pace with our needs and hence it may be necessary to plan only such improvements as may be attainable in the immediate future. The broad lines on which diets for groups of persons can be improved are (*a*) introduction of a second cereal or mixed cereal diet (the substitution of even a part of the staple cereal, *viz.*, rice or wheat by millets like ragi or bajra serves to provide a diet with better nutritive value at practically no extra cost, or even cheaper); (*b*) increased intake of pulses wherever feasible; (*c*) increased use of green leafy vegetables in the diet and (*d*) introduction of cheap flesh foods, two to three times a week, if possible.

The composition of an improved diet has been suggested in Table 8. The nutritive value of this diet is considerably superior to that of the average Indian diet and it involves only marginal extra cost. In devising this diet, some practical considerations such as the availability of different foods in the country have been taken into account.

TABLE 8

Composition of an improved diet and its approximate nutritive value

Foods	Amount (Gms.)	Nutrient	Amount
Cereals ..	.. 200	Protein ..	66 gms.
Millets ..	.. 200	Fat	50 gms.
Pulses ..	.. 70	Carbohydrate ..	430 gms.
Leafy vegetables	.. 100	Calories ..	2,430
Other vegetables	.. 85	Calcium ..	0.8 gm.
Fruits ..	.. 57	Phosphorus ..	1.4 gms.
Milk ..	.. 170	Iron ..	40 mg.
Sugar & jaggery	.. 57	Vitamin A value ..	960 μg.
Vegetable oils	.. 28	Vitamin B_1 ..	1.8 mg.
Meat, fish and eggs	.. 28	Vitamin C ..	200 mg.

Well-balanced diets are in general more expensive than deficient ones. The typical average diet shown in Table 7 is largely composed of cereals and less of other foods. The well-balanced diet richer in milk and other foods may cost twice as much or even more. It is at this point that the nutrition worker encounters the main difficulty.

Many residential institutions for children in India are very short of money. While it may often be impossible to supply a really satisfactory diet at a low

price, certain points may be worth remembering while attempting improvements in such diets. It is desirable that children should consume daily at least 8 ozs. (250 ml.) of milk, although this amount is in fact much below that recommended as "optimum" by nutrition workers. If available funds do not permit the intake of this amount of whole milk, butter milk or skimmed milk reconsuituted from skimmed milk powder, which is considerably cheaper, may be supplied. Even a little milk is better than none.

Other points to which attention should be given include the following. If the cereal consumed is milled rice, an improvement in the nutritive value of the diet (and in the health of those consuming it) can be brought about by wholly or partially substituting the milled rice by undermilled or parboiled rice, whole wheat, or one of the millets, particularly ragi. If milled rice remains the basis of the diet, it should be realised that the milled rice eater needs more "protective" foods such as pulses, milk, green vegetables, fruits, etc., than does the consumer of whole wheat or ragi. When the diet is almost wholly composed of rice and when people are so poor that they cannot afford to buy other foods except occasionally in small quantities, then the state in which the rice is eaten is of paramount importance. Parboiled rice, even when milled, is superior in nutritive value (particularly in the anti-beriberi vitamin) to raw rice milled to the same degree.

Pulses are rich in protein and in some of the B vitamins,and 2-3 ozs. (70 gms.) per day will considerably improve the nutritive value of a diet largely composed of cereals. Soyabean is rich in protein and fat, and its cultivation in our country appears to be on the increase. If soyabean is to be widely used in India, attention will have to be given to methods of preparing it in a palatable and acceptable form. As has already been stated elsewhere, the quality of pulse proteins is not so good as that of milk, fish and meat, but a preparation from germinated soyabean called "soyabean milk" has been shown to be nutritious and at the same time cheaper than cow's milk.

Malnutrition and ill-health

Extensive diet surveys carried out in our country over the last several years have shown that the diets of a good proportion of our population who belong to the poor income groups are inadequate according to accepted standards. The deficiencies in the diets are both qualitative and quantitative. Among the poorer sections of the population even the basic caloric requirements are not met. The intake of proteins is also marginal while the intake of vitamins and minerals falls far short of the desirable levels. The consumption of such unsatisfactory diets is reflected in the wide prevalence of signs of malnutrition in the low and middle income groups in the country. Results of nutrition surveys have indicated a high incidence of frank nutritional deficiency diseases, especially among the vulnerable segments of the population—pregnant women, infants, children and nursing mothers. It may be pointed out that for every case with frank signs, there are several cases in the sub-

clinical or "twilight" zone of malnutrition in the community. Many may not exhibit frank signs of malnutrition, but being far from the state of positive good health they may fall an easy prey to intercurrent ailments. In addition to diseases directly attributable to malnutrition, it is now known that malnutrition aggravates the clinical course of many infectious diseases. Thus, directly or indirectly, malnutrition accounts for a considerable part of the ill-health among our population. It is advisable that those who are in charge of institutional care of children and those concerned with practical nutrition work should have some idea of the effects of malnutrition on health.

Protein–calorie malnutrition

Among the nutritional disorders affecting children in India, those due to deficiency of protein and calories in the diet are the most important. Protein calorie malnutrition is largely responsible for the high rate of mortality and morbidity among poor children, and evidence is also accumulating in recent times that malnutrition in early life can have lasting effects on the future growth performance of the child. Not only physical growth, but also mental function and learning capacity appear to be affected after an episode of severe protein malnutrition in early childhood.

The problem of protein calorie malnutrition is particularly acute in the age period 1 to 5 years. In early infancy, breast milk meets the protein requirements of the infant adequately. One of the most gratifying features of the nutritional situation of poor Indian communities is that inspite of the unsatisfactory nutritional status of the mothers, the milk put forth by them is of good quality and quantity except for the somewhat lower vitamin content. However, even with the most satisfactory lactation, it would be impossible to sustain satisfactory growth of the infant on breast milk alone after the sixth month, and supplementary foods therefore become necessary after this period. Severe protein calorie malnutrition in children can manifest in two forms. In one form which is known as kwashiorkor, the signs and symptoms are stunting of growth, diarrhoea, discolouration and sparseness of hair, discolouration and peeling off of skin, anaemia, swelling of the body (edema) especially in the region of legs and hands, and apathy, although all these symptoms need not be present in every case. In the other form known as marasmus, in addition to stunting of growth there is extreme wasting off of muscles in the body.

It is sometimes suggested that malnutrition seen in infants and in young children is due to a deficiency of protein in the diet, and that its solution lies in increasing the intake of protein by the children. In this connection it should be emphasized that after the age of six months the deficiency may not necessarily be that of protein but that of the total quantity of food eaten by the child. As a result, the diet may be deficient in calories as well as in proteins. Under these circumstances if the deficiency of only protein is made good and not that of calories, then the protein ingested would be utilized to a considerable extent as a source of energy and not for growth and building-up of tissues.

4.

A number of surveys relating to diets of children of the pre-school age (1 to 5 years) carried out in recent years at various places in the country showed that the diets of more than 90% of the children of poor economic group were deficient in calories while the deficiency of protein was seen only in 30% of the children. Even in the latter cases, the protein deficiency would not have occurred if the existing diets had been consumed in amounts adequate to meet their energy needs. *The first priority in combating malnutrition in our children would, therefore, seem to lie in providing children enough food to satisfy their energy needs and not in distribution of protein concentrates and other protein-rich processed foods.*

Vitamin A deficiency

The tragedy of malnutrition is not so much that it is responsible for high mortality but that it cripples and permanently damages the growing generation. Of the many crippling effects, the most devastating is on vision. It has been found that the number of blind people in India runs to several hundred thousands and in a great majority of these cases blindness could have been prevented if proper nutritional care had been taken at the appropriate time, because the most common cause of preventable blindness is deficiency of vitamin A in the diet.

Vitamin A deficiency is essentially a problem of children because the requirement of the vitamin is greatest during the period of rapid growth. In the mild forms of vitamin A deficiency, the conjunctiva (the transparent covering over the white portion of the eyeballs) may show a muddy discolouration. Instead of being moist and glistening, it may appear dry and lustreless. At this stage, an observant mother may notice that the child finds some difficulty in seeing objects properly with the approach of sunset. A characteristic feature is that at dusk the child gropes about for food in its plate. This condition is described as 'night blindness', and it can be easily treated if diagnosed at this stage. In more severe forms, the cornea (the transparent central portion of the eye) becomes affected and loses its transparency. Still later, the cornea becomes eroded, softens and bulges out. In the final stages, the cornea is ruptured and destroyed and the lens inside may also be lost.

Once the cornea is affected, even the most energetic treatment is of no avail and permanent blindness cannot be prevented. The disease generally affects both eyes. In some fortunate children one eye may be affected less seriously than the other, and intensive treatment may result in partial restoration of vision at least in one eye.

The problem of blindness arising from vitamin A deficiency is one of considerable magnitude all over the country, but it is especially seen in South India and Bengal.

Knowledge as to how the disease is caused and how it can be effectively prevented is already available. Vitamin A can be obtained in the 'ready-

made state from such foodstuffs as butter, eggs, liver, etc., which are all expensive. Alternatively, many green leafy vegetables and some fruits contain carotene which can be converted to vitamin A in the body. An average daily intake of about 50 gms. of green vegetables which may not cost more than a few paise provides the required amount of vitamin A to the child. Regular intake of green leafy vegetables in such amounts will also help to build up a store of the vitamin in the body to provide for the lean seasons.

The rational approach to the problem of vitamin A deficiency in children would be to ensure adequate intake of carotene and vitamin A by the mother when she is pregnant. An intake of about 100 gms. daily of a mixture of green leafy vegetables by a pregnant woman will ensure adequate storage of vitamin A in the liver of infants at birth. The infant's diet after about the sixth month can include green vegetables properly cooked and mashed. This will ensure proper vitamin A nutrition for the infant at a time when it needs it most. Effective health education to the mother, in the Maternity and Child Health centres, to be watchful for any sign of deficiency even in the early stages and attend to the same promptly, is also necessary.

Some recent work carried out at the National Institute of Nutrition indicated that massive oral doses of vitamin A given twice a year to children upto the age of five years is also an effective method for prevention of blindness arising out of vitamin A deficiency in children. Vitamin A is capable of being stored in the liver, and it was found that administration of a single oral dose of about 200,000 I. U. of vitamin A is safe, and can build up sufficient stores to last for about 6 months or more. Programmes involving oral administration of massive doses of vitamin A as a method to control blindness due to vitamin A deficiency in children are now being implemented in a number of States by the Government.

Because vitamin A in high doses can cause toxic symptoms, massive doses of vitamin A should not be given more often than once in six months.

Administration of massive oral doses of vitamin A is not suggested for adults because the problem of vitamin A deficiency in adults is not so acute as in children.

Anaemia

Among the nutritional disorders affecting women of child-bearing age, anaemia is one of the most important, and the cause for this in most cases is iron deficiency. Pregnancy aggravates anaemia in women, and anaemia, in turn, may deleteriously affect the course of pregnancy. It has been observed that directly or indirectly anaemia is a major cause of much of the maternal mortality in the country. Anaemia can be prevented by consumption of foodstuffs like green leafy vegetables daily; and administration of iron salts is also an effective, easy and inexpensive method of curing the condition.

Since pregnant women are particularly prone to anaemia, and because of the adverse effects of anaemia on the course of pregnancy and on maternal

health, it is particularly important to see that the iron intake by pregnant women is adequate. Research work carried out at various places including the National Institute of Nutrition, Hyderabad, showed that pregnancy anaemia can be successfully prevented if adequate care is taken during at least the last 100 days of pregnancy. Distribution of tablets containing iron and folic acid to pregnant women as a measure to prevent anaemia is one of the programmes included in the Fourth Five-Year Plan by the Government.

A type of anaemia known as megaloblastic anaemia which is due to a deficiency of either folic acid or vitamin B_{12} or both, is also prevalent among the population in our country, although it is not so common as iron deficiency anaemia. Consumption of adequate amounts of green leafy vegetables and pulses which are rich in folic acid corrects folic acid deficiency, while vitamin B_{12} deficiency can be corrected only through intake of foods of animal origin such as milk, flesh foods, eggs, etc. Investigations carried out at the National Institute of Nutrition, Hyderabad showed that vitamin B_{12} deficiency anaemia can be seen even in breast-fed infants, because of the poor vitamin B_{12} content of mother's milk. The vitamin content of breast milk can be improved by supplementation of the mother's diet with vitamins.

Other deficiency diseases

Besides the deficiency diseases discussed above, deficiency of the other B complex vitamins is also generally found among the population. While specific signs vary from case to case,sore mouth and tongue and erosions at the angles of the mouth are found in many ill-fed children and are characteristic of B complex deficiency, mainly of riboflavin deficiency. Insufficient intake of thiamine leads to a disease known as beri-beri, especially if the diet is composed predominantly of carbohydrates. As discussed earlier, this condition used to be frequently seen in persons consuming large amounts of raw milled rice, as, for example, in coastal Andhra Pradesh.

Nicotinic acid deficiency in humans leads to pellagra, a disease characterized by dermatitis (inflammation of the skin) in the areas exposed to sun. Other manifestations include diarrhoea, soreness of the tongue,and some mental changes. Though endemic pellagra has long been seen in populations subsisting on maize as the staple, the disorder in an endemic form has now been seen in the Deccan region in India where jowar (sorghum) is the staple. Work carried out at the National Institute of Nutrition has shown that it is due to the presence of excessive amounts of an amino-acid leucine in jowar. Use o jowar in moderate amounts in the diet is, however, quite safe.

Consumption of adequate amounts of foods rich in B-vitamins is the best way to prevent ill-health due to a deficiency of these vitamins. Whole cereals and millets such as wheat, ragi, jowar, etc. and pulses, nuts and oilseeds are rich in B-vitamins in general. Green leafy vegetables are particularly rich in riboflavin and folic acid. Only rice poses some special problems so far as B-complex nutrition is concerned because it has to be necessarily dehusked before

consumption. If raw rice is the staple ingredient of the diet, excess milling and polishing should be avoided and excessive washing of rice prior to cooking is also to be avoided. Parboiled rice is particularly rich in thiamine even after milling, and hence it would be better for the rice-eater to use parboiled rice in place of raw rice.

The prevalence of goitre in the sub-Himalayan regions of India due to deficiency of iodine in the diet has already been mentioned. Another dietary disorder, lathyrism, characterised by progressive spastic paralysis of the legs, leading to permanent crippling and affecting mostly young men is widespread in certain parts of Madhya Pradesh and Bihar. The condition is associated with the excessive consumption of the pulse khesari dhal (*Lathyrus sativus*). The consumption of small quantities of this pulse is not harmful; but continued consumption of the pulse almost as the sole food precipitates the disease. A compound which is toxic when injected to birds has been isolated from khesari dhal, and has been chemically characterised. It is believed that this may be the substance responsible for the causation of lathyrism in humans also, and taking advantage of the water-soluble nature of the compound, inexpensive methods have been worked out at the National Institute of Nutrition, Hyderabad to remove the toxin. One method consists of steeping the pulse in hot water for two hours, draining off the water and sun-drying the material. Alternatively, the pulse can be subjected to a process similar to parboiling of paddy. Use of such methods to remove the toxin and educating people to avoid consumption of excessive amounts of khesari dhal may go a long way in the solution of the problem of lathyrism in some parts of the country.

Dietary allowances of expectant and nursing mothers

It must be realised that the well-being of the infant depends to a considerable extent on the diet of its mother during pregnancy and lactation. The nourishing of the child makes extra demands on the mother, and her requirements of proteins, vitamins and minerals are increased in consequence. Additional requirements during the later months of pregnancy and lactation have been indicated in Table 2. The extra protein can be obtained by substitution of a portion of the cereal in the diet by more pulses, milk, meat, fish or eggs, and this would also ensure the necessary additional supply of minerals. Menus designed to provide a balanced diet for the expectant and nursing mother are described in detail in the publication entitled "Nutrition for Mother and Child" brought out by the National Institute of Nutrition.

The feeding of infants and children

The subject of infant feeding and dietary requirements of infants and children has not been fully investigated in India. However, an expert committee of the FAO and WHO recently recommended the following allowances for calories and proteins for infants and children (Table 9).

TABLE 9

Calorie and protein allowances for infants and children.

Age	Calories per kg. body weight.	Protein* gm/kg. body weight
0-3 months	120	2.22
3-6 ,,	115	1.88
6-9 ,,	110	1.63
9-12 ,,	105	1.44
1-2 years	114**	1.25
2-3 ,,	107	1.15
3-4 ,,	103	1.10
4-5 ,,	100	0.95
5-10 ,,	81	0.89

* Protein suggested is in terms of milk or egg protein, and the allowance should therefore be more if the quality of the protein is lower. For a mixed protein of cereals and pulses the allowances can be raised by a factor of 1.42.

** The calorie allowances given are for males. For females the figures would be less by about 3 calories per Kg body weight.

In estimating the calorie and protein requirements of infants and children, account is usually taken of the age and actual weight. An infant which is large, vigorous and healthy needs more food than does a smaller infant of the same age. It should be understood, however, that a small emaciated infant requires more food than what is indicated by its requirements based on its actual weight to bring it into normal condition.

BREAST FEEDING

The main food of most infants is breast milk. Human milk yields about 20 calories per oz. so that an average infant in the second month, fed exclusively at the breast, would require about 600 ml. of milk a day. The breast milk secreted by Indian mothers has been found to be of the order of about 450 to 700 ml. per day during the first year of lactation, and rarely exceeds 900 ml. It will be apparent from the calorie requirements given above that breast milk alone is not able to supply the needs of the infants beyond the first six months and that supplementary foods are needed.

The best food for infants is breast milk. This statement is unquestionably true and is established not only by general experience but also by scientific observations. Breast milk has also the advantage over other kinds of milk in that it is less likely to be contaminated. Artificial feeding involves greater danger of infection, particularly among the poor whose sanitary standards are perforce low. Nevertheless, it is a mistake to assume that, because an infant is being nourished in the natural way at its mother's breast, all is well and no further attention to the infant or the mother is necessary. If the infant is to thrive on breast milk, it must receive regularly enough breast milk of good quality.

Most of the women of the lower socio-economic classes often do not get enough nourishment in their diets. Recent surveys have indicated that the diet of nursing mothers in these classes provides only about 1,800 calories and about 40 g. of protein per day, the latter not being of good quality and derived for the most part from cereals. The deficiency of such a diet in various nutrients compared to the recommendations for this group of population given earlier, will be apparent. However, it appears to be an amazing gift of Providence that these mothers, in spite of their poor diet, are able to breast-feed their babies successfully during the first six months. The quality of the milk secreted by such women compares favourably with the milk of the better-nourished women in India and elsewhere. The protein, fat and other major nutritional constituents are present in comparable amounts. In respect of vitamins of the B group (thiamine and riboflavin) and vitamin C and vitamin A, however, the milk of such women is somewhat poorer. Supplementation of the mother's diet with the vitamins of the B group and C has been found to be reflected in the milk, but with vitamin A the improvement is not quite so marked. This only serves to underline the importance of improving the diet of the mothers right from the start of pregnancy through the whole period of nursing of the baby. Better diet for the mother ensures a better store of nutrients in the foetus, a full-term well-developed baby at birth, and breast-milk of good quality and probably adequate in quantity during the lactation period.

The average Indian infant at birth weighs somewhat less than the average European infant. But the growth performance of the Indian infant runs almost parallel with the other group during the first six months even though the Indian infant is nourished solely on breast-milk during this period unlike its European counterpart who may receive other supplementary foods in addition. After the first six months, however, the nutrients provided by the mother's milk alone are not enough to sustain the growth of the baby and it is at this stage that suitable supplementary foods rich in protein and other nutrients are needed. It is for want of proper care at this stage that the Indian children of the poorer classes are often small and light as compared with the Western standards.

It is not very helpful to advise a poor woman to take more milk, fruits, vegetables, etc., since she usually cannot afford to buy such foods in sufficient quantities. At some places skim milk powder is being provided to pregnant and nursing women in maternity and child health centres and in creches, and mothers should avail of these opporutnities as much as possible. Further, the increased intake of leafy vegetables and seasonal fruits, wherever possible, has to be encouraged. There is no scientific basis for avoidance of fruits and vegetables by expectant and nursing women. Traditional superstitions and beliefs in this regard should therefore be vigorously condemned.

The amount of milk supplied by a mother can be estimated by "test feeds" which means careful weighing of the infant before and after feeding, or by completely expressing milk from the breast into a sterile bottle and measuring it. In practice, the best guide to the adequacy of the milk supply is a regular and sufficient gain in weight by the infant, and test feeding is neces-

sary only in the case of infants who fail to achieve an average gain of about 4-5 ozs. (120 gms.) per week.

Artificial feeding

If the quantity of breast milk available daily is not enough, then the infant's diet should be supplemented with some other milk suitably modified. Sometimes no breast-milk may be available for the infant in which case the infant has to be entirely bottle-fed. Cow's milk, the food most commonly used in the 'artificial' feeding of infants, has a calorie value almost similar to that of human milk. Buffalo milk, which is very rich in fat, yields more calories.

The milk of cows, goats, and buffaloes is richer in protein as compared to human milk and hence whenever such milk is given as a substitute, it must be suitably diluted with clean boiled water to bring the protein content nearer to that of breast-milk. Another point of importance is that human milk contains more sugar (lactose) than most other mammalian milks do, and when these are diluted, their sugar content falls far below that of human milk. To correct this deficiency, it is usual to add sugar to the milk given to infants to replace breast-milk.

If cow's milk has to be given to an infant, then a suitable dilution during the first week would be addition of 2 parts of water to one part of milk. The proportion of water may be gradually reduced so that by six months the infant gets whole cow's milk as such without any dilution. The amount of sugar added per day may be gradually increased from about one teaspoonful (about 6 grams) in the first week to 4 teaspoonfuls (about 24 grams) at 6 months.

During the first few days of life, the baby should be given 3-4 feeds per day. From this point until the end of the first month, it may be given 6 feeds daily. Subsequently the number of feeds may be reduced to 5 and this feeding schedule can be maintained throughout most of the first year of life.

It is essential that all milk given to infants should be boiled, and all utensils used for feeding should be steamed or boiled in clean water.

Most infants thrive well on breast milk alone during the first six months, especially if the mother is well-fed during pregnancy and lactation. The nutritional value of anything given in addition to breast-milk during this period must be weighed against the very great danger of infection and infantile diarrhoea which is quite common during this period, particularly in the context of the very poor hygiene that is prevalent in most homes. However, if the hygienic preparation of supplementary foods can be adequately taken care of, the following may be worth considering.

Vitamin C in some form may be given to the infant from the second month onward, and the quantity given should correspond to a daily dose of not less than 5 milligrams of vitamin C. About 10 ml. (two and a half teaspoonsfuls) of orange or tomato juice will usually supply this amount. Other kinds of

fruit juice—papaya juice, mango juice, etc., can also be used as a source of this vitamin.

Infants fed on the breast-milk of a healthy mother or on whole cow's milk of good quality can thrive well without receiving additional supplies of vitamin A. It is, however, often recommended that cod or shark liver oil should be given to infants as a supplement, beginning with 2 drops a day at about the 15th day. The dose can be increased gradually until one teaspoonful is reached by the end of the second month. Cod or shark liver oil is of value because it contains vitamin D also. In many parts of India vitamin D is supplied by the action of sunlight on the skin.

Premature and sickly children may be benefited by iron given in various forms. Children fed exclusively on milk over long periods may develop anaemia, which can be prevented by the administration of iron.

Various forms of milk: Special infant Foods

In many countries today, there is an increasing tendency to use preserved milk and infant foods of various kinds in place of breast-milk and fresh cow's milk. In India this practice is largely confined to the more prosperous classes, but it is not uncommon to find poor people buying tinned milk etc., for their infants. Purchasers often feel that they are buying the best form of food for their babies and children. It is important that those concerned with teaching the people about food and diet should have a clear idea about the nature and value of such preparations.

Evaporated milk.—This is cow's milk from which water has been evaporated under reduced pressure at a sufficiently high temperature to destroy all bacteria. The resulting product is thick milk about twice as concentrated as fresh milk, which can be reconstituted into milk by the addition of water. Evaporated milk, sometimes called "unsweetened condensed milk", is a wholesome product, and can be used to replace other forms of milk in the infants and adults. It has however the disadvantage that it keeps only for a short time after the container is opened. Vitamin C is destroyed in the manufacturing process, and it is essential that infants fed exclusively such milk should be given this vitamin in the form of fruit juice. If originally prepared from milk of good quality, evaporated milk may be superior in nutritive value to fresh milk which is usually subjected to adulteration.

Condensed milk (sweetened).—This is prepared in a manner similar to evaporated milk except that lower degrees of heat are employed. Cane sugar is added in large quantities and the final product may contain as much as 20 per cent of sugar. Condensed sweetened milk cannot be recommended for infant feeding. The large amount of sugar present involves a proportionate decrease in the content of protein, fat and minerals. Further, the sugar may cause intestinal irritation and upset.

Dried or powdered milk.—This is cow's milk which has been rapidly dried to powder at a high temperature by various industrial processes. The resulting

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product is simply the solids of milk in powder form. Dried milk, which can be reconstituted into liquid milk by the addition of about 8 times its weight of water, is a sound food product much used in infant feeding. "Humanised" dried milks are products made from milk powder. They are processed such that they resemble human milk in composition. These have achieved wide popularity as infant foods, but it must be remembered that there is no special advantage in such products compared to the other forms of dried milk. Vitamin C should always be given to infants fed dried milk.

Buffalo milk is available in quantity in certain regions in the country. Buffalo milk is richer in fat and hence it has to be suitably modified and processed before giving to infants. Advances in food technology in the country have made this possible and an infant food prepared from buffalo milk is being marketed. The main ingredient of milk which is of commercial value is the fat. Hence to enable the vulnerable segments of the population to obtain the nutritional benefits of milk at a low cost, "toned" milk, which is whole buffalo milk mixed with enough amount of skimmed milk so as to bring the fat content equal to that of cow's milk, is distributed in some places.

All these kinds of milk are produced in the "whole" or "skimmed" form, and there are also half-cream preparations. Skimmed milk preparations are considerably cheaper than whole milk preparations. No type of skimmed milk is suited to form the sole food of infants and its exclusive use may lead to a very serious eye disease called keratomalacia which is due to vitamin A deficiency which is a common cause of blindness. Condensed sweetened skimmed milk is particularly dangerous if used in this manner. Nevertheless, milk reconstituted from evaporated or dried skimmed milk can be used safely if some substance containing vitamin A (*e.g.*, cod or shark liver oil) is given at the same time. Actually skimmed milk reconstituted from powder can justifiably be recommended for infants of very poor mothers if it is the case of cheap skimmed milk or no milk at all. It is, however, essential that vitamin A should be given simultaneously. Older children living on a mixed diet can greatly benefit by skimmed milk.

Dried milk with malted cereals.—Foods of this nature have little place in infant welfare work though they may be useful when given under medical supervision in special cases. The proportion of altered starch to milk is usually high (about 50 per cent), and such foods given alone are unsuitable for prolonged feeding. Moreover, their cost is excessive in relation to their nutritive value.

Weaning

Weaning is the process in which an infant's diet pattern is gradually changed from liquid foods like breast milk and substitute milk preparations to cooked solid foods. Contrary to general belief, this process can be started from the age of three months, and cereal foods can be given to the infant from this age onwards provided the food is cooked soft and mashed to a thin consistency. Weaning should start however from the sixth month because breast-

milk alone cannot sustain the growth of the infant after this age. The infant at this stage would be able to digest starchy foods, and soft-cooked foodstuffs like cereal grains and pulses can be introduced into the infant's diet to meet the increased demands for nutrients by the infant. The process of weaning also helps the child in getting introduced to different tastes so that by the time it is fully weaned the child is able to consume a wider variety of foodstuffs, and eventually the diet can be brought in line with dietary habits and taste pattern of the community.

Various surveys carried out in our country have shown that among the poorer sections of the people breast-milk meets a major part of the nutrient needs of the infant upto the age of one year. Under the prevailing circumstances in which other hygienic and nutritious foods for the infants is beyond the economic reach of the family, it is a good policy to continue breast-feeding as long as it is possible even if cereal foods are introduced in the diet of the infant from the sixth month onwards.

The principles underlying introduction of foods other than breast-milk to the infant may be briefly stated as follows. During the first six months, if breast milk is adequate as shown by continued and satisfactory growth of the infant, no other food is necessary. If it is possible to provide foods hygienically to the baby, fish liver oil can be given from the first month and fruit juice from the second month onwards. These must necessarily be given if the infant is artificially fed. Semi-solid foods in the shape of a gruel or paste of a cereal such as rice, ragi, etc., is the first food to be introduced in addition to breast milk. As soon as the infant becomes accustomed to the first solid food, the diet must be diversified so that the infant may acquire a taste for various foods. Soft vegetables like spinach, carrots, etc., cooked, mashed and sieved may be included in the dietary. Soft and spongy iddli (or Dokla in Gujarat), which is a good combination of parboiled rice and pulse in digestible form, can be mashed with milk and fed with a spoon to the baby. If egg can be afforded, it is better to start feeding the yolk mixed with the cereal or milk in the 7th or 8th month and give the white of egg also after the child is about 12 months old. Some infants are allergic to the white of egg which may lead to digestive upsets and hence this suggestion. Minced meat and fish can be given to the child after about 15 months of age. More details on the introduction of weaning foods are given in the booklet entitled "Nutrition for Mother and Child" referred to earlier.

By the age of one year the baby should receive solid food including cereals, pulses, vegetables, fruits etc., but a considerable proportion of the diet should still consist of milk. This is necessary to satisfy adequately the protein needs of the infant for healthy growth.

THE DFFICULTIES OF INFANT WELFARE WORK IN PRACTICE

In the previous sections sound methods of infant feeding have been outlined. In practice, however, it is often extremely difficult to apply such

methods because of the cost involved. The greatest need of poor mothers and their infants attending welfare centres is usually more food (milk, etc.) and there is not enough money available to supply their requirements. The weaned infant often presents a problem of great difficulty. As long as it is receiving breast milk it may do fairly well, but if on weaning it passes on to a diet of, let us say, rice gruel without sufficient milk, a great deterioration in its condition often takes place.

The most important aspect of weaning is the introduction of solid foods and not stoppage of breast milk.

It may sometimes happen that the breast milk is not adequate to meet the nutritional needs of the infant even upto six months. In such cases, milk supplements are necessary for the infant. If whole milk is not available, skimmed milk may be given to the infant, and it is advisible to administer also cod or shark liver oil in sufficient doses to meet its vitamin A requirements. Cheap malted cereals such as ragi may also be used to increase the calorie intake of infants. If infants who are partially or wholly weaned cannot be supplied with enough milk, malnutrition can be prevented to some extent by giving such foods as gruels based on whole cereals together with soft cooked pulses, various preparations of vegetables, mashed fruits etc. The worst cases of malnutrition usually follow a diet which consists almost wholly of milled rice. Infant welfare workers should teach mothers how to prepare suitable cheap cereal, vegetable and fruit mixtures for their infants. The type of mixture depends on the local customs, and the kinds of food which are cheap and readily available.

The use of processed foods is being sometimes suggested as a solution to the problem of supplementary feeding to children. However, since a majority of people in India live in rural areas, and since many of them are living under economic conditions in which they can hardly afford these foods, processed foods cannot be expected to make any impact on the solution of the problem. The approach under these circumstances must, therefore, lie in the effective use of the locally available and inexpensive foods and in educating the community, especially the mothers, in the proper use of such resources. There are a few projects operating in the country covering nutrition programmes among the pre-school children; but the emphasis in these has so far been on the distribution of foods given as aid by external agencies without any attempt to mobilize community participation and to harness the local resources. The result has been that in most cases the programmes have not made any significant impact on the community.

Some attempts made in this direction by the National Institute of Nutrition showed that it is possible to develop action programmes with the active participation of the community to utilize the local food resources to the best advantage of the pre-school children of the community. Recipes based on locally available foods and on local food habits have been evolved and some of them which were found acceptable to the community are given below:

RECIPES

(The quantities indicated are per child per day).

1. *Rice porridge*

Rice	50 g.
Powdered roasted groundnut	15 g.
Powdered roasted greengram dhal ..	25 g.
Sugar or jaggery	30 g.

Method:

Cook the rice. Add to the cooked rice the pulse and groundnut powders. Add sugar or jaggery and cook for a few minutes.

2. *Ragi or bajra infant food*

Ragi or Bajra (dehusked, roasted) ..	60 g.
Roasted greengram dhal(or any other dhal) ..	15 g.
Roasted groundnut	10 g.
Roasted decorticated gingelly (til) seeds ..	5 g.
Skim milk powder	15 g.

Method:

Powder all the roasted ingredients individually, mix all the ingredients in the proportions suggested, and store in air-tight containers.

Whenever required, take suitable amounts (60-70 g. or about three tablespoonfuls for use throughout the day), mix with a small amount of hot water, cook for a few more minutes and serve with sugar or salt.

3. *Wheat-green gram laddu*

Whole wheat	30 g.
Greengram dhal	20 .g
Groundnuts	8 g.
Jaggery	20 g.

Method:

Roast the wheat, greengram dhal and groundnuts separately and powder them. Mix the powders and make the mixture into balls with thin syrup prepared from the jaggery.

Detailed studies were also carried out with one of the above recipes (recipe No. 3) in a village around Hyderabad. In this programme, all the operations including preparation of the food and its distribution to children were carried out by the women of the village and by the members of the local Youth Club. This work clearly showed that such a programme would be recei-

ved well by the village community, and an evaluation of the feeding programme revealed that incidence of malnutrition among pre-school children can be considerably reduced with such preparations which are much cheaper than proprietary and processed foods.

The rate of infant mortality (death before one year) in India has decreased from more than 200 per 1,000 in the early decades of this century, to about 68 per 1,000. Even so, the figure is high as compared to the very low figures in the more advanced countries. Malnutrition is one of the major causes for this situation and it is necessary that improvement of the nutrition of the mother and infant should receive the highest priority.

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NOTES ON FOOD COMPOSITION TABLES

The information contained in the food composition tables which follow is, for the most part, based on analysis of foods made at the National Institute of Nutrition, formerly at Coonoor and now at Hyderabad. In order to give wider coverage both in terms of foodstuffs and in terms of food constituents, analytical data obtained from various other centres and laboratories like the University College of Science and Technology, Calcutta, Haffkine Institute, Bombay, Central Food Technological Research Institute, Mysore, State Food and Drug Laboratories, Ambala Cantonment, and Nutrition Laboratory, Patna, have also been made use of. The work in most of these laboratories was aided by grants from the Indian Council of Medical Research, New Delhi. In addition, results of analysis of Indian foodstuffs published in various scientific journals have also been used in the compilation of the tables.

The data given relate only to the edible portion of the foodstuffs as purchased and the per cent edible matter has been given wherever possible.

The protein values were calculated from the nitrogen content, and the factor used was 6.25 for all the foodstuffs. The values for fat relate to the total ether extractives, and the carbohydrate content given is the difference between 100 and the sum of moisture, protein, fat, fibre and ash contents.

The food energy was calculated from the content of the proximate principles assuming that proteins, carbohydrates and fats yield 4, 4 and 9 Kcals. respectively per gm.

Carotene was estimated by extraction of the total pigments with alcohol and partitioning it with petroleum ether after saponification. The other pigments were removed by treatment with calcium carbonate and the yellow colour was measured as carotene.

The values for thiamine were obtained using the thiochrome method for the estimation, and the values for riboflavin and nicotinic acid were as far as possible those obtained using microbiological methods of assay. Vitamin C was estimated by means of 2, 6-dichlorophenol indophenol except with coloured extracts, in which case xylene extraction method was used for the estimation.

Estimation of folic acid was done microbiologically with *L. casei* as the test organism, and the free and total folic acid values are those obtained respectively before and after incubation of the food extracts with a source of folic acid conjugase. The sources of the enzyme included chicken pancreas powder, a rat liver preparation and human plasma. Vitamin B_{12} was estimated using *Euglena gracilis* as the test organism.

The mineral elements were estimated using the standard procedures (mostly AOAC), and the acid-base balance was calculated using the following base or acid equivalents per mg. of the element.

	ml 0.1 N alkali		ml 0.1 N acid
Sodium	.. 0.4350	Phosphorus	.. 0.6457
Potassium	.. 0.2558	Chlorine	.. 0.2820
Calcium	.. 0.4991	Sulphur	.. 0.6238
Magnesium	.. 0.8224		

Units for vitamin A activity

It is usual practice to express vitamin A value of a foodstuff in terms of International Units of vitamin A. In vegetable foods the carotene content is usually converted to the vitamin A value assuming that 0.6 μg of carotene is equivalent to 1 I. U. of vitamin A. However, in view of lack of definite information about the conversion of carotene to vitamin A in the body, the values for carotene are given now as μg per 100 gms. of the foodstuff in this book. The values for vitamin A are also given as μg retinol per 100 gm. assuming that one International Unit of vitamin A is equivalent to 0.3 μg. of retinol.

Amino-acid composition

The data for the amino-acid composition of foodstuffs were compiled from the values available in literature and considered reliable, and they included also the values obtained at the National institute of Nutrition.

Arrangement of Tables

Information regarding the important nutrients like proximate principles and important minerals and vitamins is given in Table 1 of the Food Composition Tables, and this is followed by other tables containing the available information about the other constituents, including amino-acid composition. Although the foodstuffs are sub-divided into food groups, the numbering for all the foodstuffs is done serially. To facilitate easy reference, the information and data relating to each foodstuff is given under the same serial number in all the tables and in the appendix.

Absence of data for any nutrient in the Tables indicates only that authentic figures are not available, and it does not mean total absence of the nutrient in the foodstuff.

TABLES

OF

FOOD COMPOSITION

TABLE 1

Proximate principles, minerals and vitamins

All the values given are per 100 gms. of edible portion

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	CEREAL GRAINS AND PRODUCTS																
1.	Baira .. .. *Pennisetum typhoideum*	84	12.4	11.6	5.0	2.3	1.2	67.5	361	42	296	5.0	132	0.33	0.25	2.3	0
2.	Bamboo seeds .. .. *Bambusa arundinacea*	100	7.8	13.1	1.2	1.1	0.9	75.9	367	37	162	6.4	..	0.17	0.12	1.1	0
3.	Banti .. .. *Echinochloa stagnina*	..	11.3	8.3	4.3	1.4	..	74.7	371	14	121	5.0	0	0.35	0.03	1.8	0
4.	Barley .. .. *Hordeum vulgare*	100	12.5	11.5	1.3	1.2	3.9	69.6	336	26	215	3.0	10	0.47	0.20	5.4	0
5.	Buckwheat .. .. *Fagopyrum esculentum*	74	11.3	10.3	2.4	2.3	8.6	65.1	323	64	355	15.5	0	0.90	0.34	4.4	0
6.	Italian millet .. .. *Setaria italica*	79	11.2	12.3	4.3	3.3	8.0	60.9	331	31	290	12.9	32	0.59	0.11	3.2	0
7.	Job's tears .. .. *Coix lachryma*	..	10.8	17.5	6.0	1.8	0.5	63.4	378	23	408	4.2	..	0.31	0.15	6.7	0
8.	Jowar .. .. *Sorghum vulgare*	100	11.9	10.4	1.9	1.6	1.6	72.6	349	25	222	5.8	47	0.37	0.13	3.1	0

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
9.	Maize, dry *Zea mays* ..	100	14.9	11.1	3.6	1.5	2.7	66.2	342	10	348	2.0	90	0.42	0.10	1.8	0
10.	Maize, tender *Zea mays* ..	37	67.1	4.7	0.9	0.8	1.9	24.6	125	9	121	1.1	32	0.11	0.17	0.6	6
11.	Oatmeal *Avena byzantina* ..	100	10.7	13.6	7.6	1.8	3.5	62.8	374	50	380	3.8	0	0.98	0.16	1.1	0
12.	Panivaragu *Panicum miliaceum* ..	59	11.9	12.5	1.1	1.9	2.2	70.4	341	14	206	5.0	0	0.20	0.18	2.3	0
13.	Ragi *Eleusine coracana* ..	100	13.1	7.3	1.3	2.7	3.6	72.0	328	344	283	6.4	42	0.42	0.19	1.1	0
14.	Rice, parboiled, handpounded *Orya sativa*	100	12.6	8.5	0.6	0.9	..	77.4	349	10	280	2.8	9	0.27	0.12	4.0	0
15.	Rice, parboiled, milled *Oryza sativa* ..	100	13.3	6.4	0.4	0.7	0.2	79.0	346	9	143	4.0	..	0.21	0.05	3.8	0
16.	Rice, raw, handpounded *Oryza sativa* ..	100	13.3	7.5	1.0	0.9	0.6	76.7	346	10	190	3.2	2	0.21	0.16	3.9	0
17.	Rice, raw, milled *Oryza sativa* ..	100	13.7	6.8	0.5	0.6	0.2	78.2	345	10	160	3.1	0	0.06	0.06	1.9	0
18.	Rice bran *Oryza sativa* ..	..	11.0	13.5	16.2	6.6	4.3	48.4	393	67	1410	35.0	..	2.70	0.48	..	0
19.	Rice flakes *Oryza sativa* ..	100	12.2	6.6	1.2	2.0	0.7	77.3	346	20	238	20.0	0	0.21	0.05	4.0	0
20.	Rice, puffed *Oryza sativa* ..	100	14.7	7.5	0.1	3.8	0.3	73.6	325	23	150	6.6	0	0.21	0.01	4.1	0
21.	Samai *Panicum miliare* ..	66	11.5	7.7	4.7	1.5	7.6	67.0	341	17	220	5.2	0	0.30	0.09	3.2	0
22.	Sanwa millet *Echinochloa frumentacea* ..	..	11.9	6.2	2.2	4.4	9.8	65.5	307	20	280	2.9	0	..	..	4.2	0
23.	Semolina *Triticum aestivum* ..	100	..	10.4	0.8	..	0.2	74.8	348	16	102	1.6	..	0.12	0.03	1.6	0

Proximate principles, minerals and vitamins—*contd.*

S.No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
24.	Varagu *Paspalum scrobiculatum*	58	12.8	8.3	1.4	2.6	9.0	65.9	309	27	188	5.2	0	0.33	0.09	2.0	0
25	Vermicelli *Triticum aestivum* ..	100	11.7	8.7	0.4	0.7	0.2	78.3	352	22	92	2.0	0	0.19	0.05	1.8	0
26.	Wheat Bulgar *Triticum aestivum* ..	100	9.8	8.2	1.6	1.5	1.7	77.2	356	37	298	4.9	..	0.74	0.11	4.8	0
27.	Wheat (whole) *Triticum aestivum* ..	100	12.8	11.8	1.5	1.5	1.2	71.2	346	41	306	4.9	64	0.45	0.17	5.5	0
28.	Wheat flour (whole) *Triticum aestivum* ..	100	12.2	12.1	1.7	2.7	1.9	69.4	341	48	355	11.5	29	0.49	**0.17**	4.3	0
29.	Wheat flour (refined) *Triticum aestivum* ..	100	13.3	11.0	0.9	0.6	0.3	73.9	348	23	121	2.5	25	0.12	0.07	2.4	0
30.	Wheat germ *Triticum aestivum* ..	100	5.2	29.2	7.4	3.5	1.4	53.3	397	40	846	6.0	..	1.40	0.54	2.9	0
	PULSES AND LEGUMES																
31.	Bengal gram (whole) *Cicer arietinum* ..	100	9.8	17.1	5.3	3.0	3.9	60.9	360	202	312	10.2	189	0.30	0.15	2.9	3
32.	Bengal gram dhal *Cicer arietinum* ..	100	9.9	20.8	5.6	2.7	1.2	59.8	372	56	331	9.1	129	0.48	0.18	2.4	1
33.	Bengal gram (Roasted) *Cicer arietinum* ..	100	10.7	22.5	5.2	2.5	1.0	58.1	369	58	340	9.5	113	0.20	...	1.3	0

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
34.	Black gram dhal *Phaseolus mungo* ..	100	10.9	24.0	1.4	3.2	0.9	59.6	347	154	385	9.1	38	0.42	0.20	2.0	0
35.	Cow pea *Vigna catjang* ..	97	13.4	24.1	1.0	3.2	3.8	54.5	323	77	414	5.9	12	0.51	0.20	1.3	0
36.	Field bean, dry *Dolichos lablab* ..	..	9.6	24.9	0.8	3.2	1.4	60.1	347	60	433	2.7	0	0.52	0.16	1.8	0
37.	Green gram (whole) *Phaseolus aureus Roxb* ..	100	10.4	24.0	1.3	3.5	4.1	56.7	334	124	326	7.3	94	0.47	**0.27**	2.1	0
38.	Green gram dhal *Phaseolus aureus Roxb.* ..	100	10.1	24.5	1.2	3.5	0.8	59.9	348	75	405	8.5	49	**0.47**	0.21	2.4	0
39.	Horse gram *Dolichos biflorus* ..	100	11.8	22.0	0.5	3.2	5.3	57.2	321	287	311	8.4	71	0.42	0.20	1.5	1
40.	Khesari dhal *Lathyrus sativus* ..	100	10.0	28.2	0.6	2.3	2.3	56.6	345	90	317	6.3	120	0.39	0.17	2.9	0
41.	Lentil *Lens esculenta* ..	100	12.4	25.1	0.7	2.1	0.7	59.0	343	69	293	4.8	270	0.45	0.20	2.6	0
42.	Moth beans *Phaseolus aconitifolius Jacq.* ..	100	10.8	23.6	1.1	3.5	4.5	56.5	330	202	230	9.5	9	0.45	0.09	1.5	2
43.	Peas, dry *Pisum sativum* ..	100	16.0	19.7	1.1	2.2	4.5	56.5	315	75	298	5.1	39	0.47	0.19	3.4	0
44.	Peas, roasted *Pisum sativum* ..	100	10.1	22.9	1.4	2.4	4.4	58.8	340	81	345	6.4	18	0.47	0.21	3.5	0
45.	Rajmah *Phaseolus vulgaris* ..	..	12.0	22.9	1.3	3.2	..	60.6	346	260	410	5.8	..	..	..	..	..
46.	Redgram dhal *Cajanus cajan* ..	100	13.4	22.3	1.7	3.5	1.5	57.6	335	73	304	5.8	132	0.45	0.19	2.9	0
47.	Soyabean *Glycine max Merr.* ..	..	8.1	43.2	19.5	4.6	3.7	20.9	432	240	690	11.5	426	0.73	0.39	3.2	..
48.	Sutari *Phaseolus calcaratus* ..	..	9.6	21.5	0.3	3.5	4.2	60.9	332	302	297	..	..	..	..	..	..

Proximate principles, minerals and vitamins - *contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	LEAFY VEGETABLES																
49.	Agathi *Sesbania grandiflora*		73.1	8.4	1.4	3.1	2.2	11.8	93	1,130	80	3.9	5,400	0.21	0.09	1.2	169
50.	Amaranth, spined *Amaranthus spinosus*		85.0	3.0	0.3	3.6	1.1	7.0	43	800	50	22.9	3,564	0	..	..	33
51.	Amaranth, tender *Amaranthus gangeticus*	39	85.7	4.0	0.5	2.7	1.0	6.1	45	397	83	25.5	5,520	0.03	0.30	1.2	99
52.	Ambat chuka *Rumex vesicarius*		95.2	1.6	0.3	0.9	0.6	1.4	15	63	17	8.7	3,660	0.03	0.06	0.2	12
53.	Araikeerai *Amaranthus tristis*		87.0	2.8	0.4	2.4	..	7.4	44	364	52	38.5	..	..	..	..	..
54.	Bamboo, tender shoots *Bambusa arundinacea* ..	54	88.8	3.9	0.5	1.1	..	5.7	43	20	65	0.1	0	0.08	0.19	0.2	5
55.	Bathua leaves *Chenopodium album*		89.6	3.7	0.4	2.6	0.8	2.9	30	150	80	4.2	1,740	0.01	0.14	0.6	35
56.	Beet greens *Beta vulgaris*	51	86.4	3.4	0.8	2.2	0.7	6.5	46	380	30	16.2	5,862	0.26	0.56	3.3	70
57.	Bengal gram leaves *Cicer arietinum*	92	73.4	7.0	1.4	2.1	2.0	14.1	97	340	120	23.8	978	0.09	0.10	0.6	61
58.	Bottle gourd leaves *Lagenaria vulgaris*		87.9	2.3	0.7	1.7	1.3	6.1	39	80	59	..	..	..	..	..	..

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
59.	Broad bean leaves .. .. *Vicia faba*	..	77.6	5.6	0.3	1.3	3.7	11.5	71	111	149	..	..	..	..	..	..
60.	Brussels sprouts .. .. *Brassica oleracea var. gemmifera*	100	85.5	4.7	0.5	1.0	1.2	7.1	52	43	82	1.8	126	0.05	0.16	0.8	72
61.	Cabbage .. .. *Brassica oleracea var. capitata*	88	91.9	1.8	0.1	0.6	1.0	4.6	27	39	44	0.8	120	0.06	0.09	0.4	124
62.	Carrot leaves .. .. *Daucus carota*	51	76.6	5.1	0.5	2.8	1.9	13.1	77	340	110	8.8	5,700	0.04	0.37	2.1	70
63.	Cauliflower greens .. .. *Brassica oleracea var. botrytis*	..	80.0	5.9	1.3	3.2	2.0	7.6	66	626	107	40.0	..	..	..	..	..
64.	Celery leaves *Apium graveolens var. dulce*	71	88.0	6.3	0.6	2.1	1.4	1.6	37	230	140	6.3	3,990	0	0.11	1.2	62
65.	Ceylon pasali *Talinum triangulare*	..	91.2	1.9	0.7	1.9	..	4.3	31	120	16	0.9	..	..	..	..	..
66.	Chakravarthi keerai *Amaranthus sp.*	..	80.6	4.5	0.6	4.2	1.6	8.5	57	321	71	18.0	..	..	..	..	..
67.	Chekkur manis *Sauropus androgynus*	100	73.6	6.8	3.2	3.4	1.4	11.6	103	570	200	28.0	5,706	0.48	0.32	2.6	367
68.	Chimti sag *Polygonum plebejum*	..	83.2	3.2	0.7	3.9	2.1	6.9	46	194	48	..	..	..	..	..	..
69.	Chozhi keerai	..	90.0	2.2	0.4	2.1	..	5.3	33	230	23	17.8	..	..	..	..	..
70.	Colombo keerai	..	91.3	2.5	0.4	2.1	..	3.7	28	90	130	11.9	..	..	..	..	..
71.	Colocasia leaves (black variety) *Colocasia antiquorum*	..	78.8	6.8	2.0	2.5	1.8	8.1	77	460	124	38.7	12000	0.08	0.45	1.9	55

Proximate principles, minerals and vitamins—*contd.*

S.No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
72.	Colocasia leaves (green variety) *Colocasia antiquorum*	..	82.7	3.9	1.5	2.2	2.9	6.8	56	227	82	10.0	10278	0.22	0.26	1.1	12
73.	Colocasia leaves, dried *Colocasia antiquorum*	..	9.3	13.7	5.9	12.8	16.0	42.3	277	1546	308	..	..	..	..	..	..
74.	Coriander leaves *Coriandrum sativum*	70	86.3	3.3	0.6	2.3	1.2	6.3	44	184	71	18.5	6918	0.05	0.06	0.8	135
75.	Cow pea leaves *Vigna catjang*	..	89.0	3.4	0.7	1.6	1.2	4.1	38	290	58	20.1	6072	0.05	0.18	0.6	4
76.	Curry leaves *Murraya koenigii*	83	63.8	6.1	1.0	4.0	6.4	18.7	108	830	57	7.0	7560	0.08	0.21	2.3	4
77.	Drumstick leaves *Moringa oleifera*	75	75.9	6.7	1.7	2.3	0.9	12.5	92	440	70	7.0	6780	0.06	0.05	0.8	220
78.	Fenugreek leaves *Trigonella foenum-graecum*	59	86.1	4.4	0.9	1.5	1.1	6.0	49	395	51	16.5	2340	0.04	0.31	0.8	52
79.	Fetid cassia, fresh *Cassia tora*	..	84.9	5.0	0.8	1.7	2.1	5.5	49	520	39	12.4	10152	0.08	0.19	0.8	82
80.	Fetid cassia, dried *Cassia tora*	..	9.7	20.7	3.9	11.8	10.4	43.5	292	3200	292	..	..	..	..	..	..
81.	Garden cress *Lepidium sativum*	..	82.3	5.8	1.0	2.2	..	8.7	67	360	110	28.6	..	0.15	..	..	..
82.	Garden sorrel (sepals)	100	91.9	0.6	0.2	0.9	1.3	5.1	25	130	20	1.7	78	0	0.07	0	5
83.	Giria sag *Suaeda nudiflora*	..	89.3	2.0	0.4	3.8	0.9	3.6	26	50	79	1 6	2100	0.01	0.05	0.2	13

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
84.	Gogu *Hibiscus cannabinus*	76	86.4	1.7	1.1	0.9	..	9.9	56	172	40	5.0	2898	0.07	0.39	1.1	20
85.	Gulcharni *Calonyctions muricatum*	..	91.7	1.3	0.5	1.2	1.0	4.3	27	59	60	..	..	..	..	..	..
86.	Ipomoea leaves *Ipomoea reptans*	..	90.3	2.9	0.4	2.1	1.2	3.1	28	110	46	3.9	1980	0.05	0.13	0.6	37
87.	Kasini keerai *Raphanus sp.*	..	91.2	1.9	0.7	1.6	..	4.6	33	94	21	8.0	..	..	..	..	..
88.	Kalavan keerai	..	75.2	6.8	0.9	4.3	2.3	10.5	77	624	85	24	..	..	..	..	..
89.	Karslanganni keerai (white)	..	81.1	4.4	0.8	4.5	..	9.2	62	306	462	8.9	..	..	..	..	..
90.	Karslanganni keerai (yellow)	..	93.7	1.1	0.2	1.4	0.4	3.2	19	39	10	3.9	..	..	..	..	..
91.	Katha sag *Dentella repens*	..	90.6	1.9	0.5	2.3	1.7	3.0	24	253	35	..	..	..	..	..	..
92.	Kena sag *Commelina benghalensis*	..	92.2	2.1	0.4	2.0	0.8	2.5	22	100	50	..	..	..	..	..	..
93.	Khesari leaves *Lathyrus sativus*	..	84.2	6.1	1.0	1.1	2.1	5.5	55	160	100	7.3	3000	0.01	0.03	..	41
94.	Knol-khol greens *Brassica oleracea var. caulorapa*	73	86.7	3.5	0.4	1.2	1.8	6.4	43	740	50	13.3	4146	0.25	..	3	157
95.	Koila karha sag *Asteracantha longifolia*	..	87.2	3.0	0.4	2.8	1.4	5.2	36	330	21	..	..	..	..	..	..
96.	Konar sag *Bauhinia purpurea*	..	78.1	3.6	1.0	2.1	5.5	9.7	62	312	92	..	..	..	..	..	..
97.	Korla leaves *Bauhinia malabarica*	..	82.7	6.1	0.7	1.5	..	9.0	67	112	122	12.1	1764	0.10	0.27	1.70	10

Proximate principles, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible % portion	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
98.	Koya keerai *Amaranthus sp.*	..	88.0	2.8	0.5	1.2	2.2	5.3	37	292	51	2.5	..	..	..	..	..
99.	Kuppa keerai *Amaranthus viridis*	..	81.8	5.2	0.3	2.8	6.1	3.8	38	330	52	18.7	..	..	..	..	178
100.	Kuppameni *Acalypha indica*	..	80.5	6.7	1.4	3.1	2.3	6.0	64	667	99	17.3	..	..	..	..	147
101.	Lettuce *Lactuca sativa*	66	93.4	2.1	0.3	1.2	0.5	2.5	21	50	28	2.4	990	0.09	0.13	0.50	10
102.	Lettuce tree leaves, mature *Pisonia alba*	..	81.7	5.1	0.4	2.6	..	10.2	65	320	80	2.6	..	..	..	..	..
103.	Lettuce tree leaves, tender *Pisonia alba*	..	90.2	3.6	0.2	2.2	0.6	3.2	29	170	60	3.6	888	0.03	0.11	0.2	10
104.	Love-lies - bleeding *Amaranthus caudatus*	..	90.0	3.0	0.7	3.3	1.0	2.0	26	200	40	..	..	..	..	..	..
105.	Manal keerai *Mullugo sp.*	..	91.7	2.4	0.4	1.0	2.2	2.3	22	370	67	12.3	..	..	..	..	..
106.	Manathakkali leaves *Solanum nigrum*	..	82.1	5.9	1.0	2.1	..	8.9	68	410	70	20.5	..	..	0.59	0.9	11
107.	Mata sag (lupu) *Antidesma diandrum*	..	7.2	7.2	4.8	9.5	13.5	57.8	303	1717	80	..	..	..	..	..	..
108.	Mayalu *Basella rubra*	..	90.8	2.8	0.4	1.8	..	4.2	32	200	35	10	7440	0.03	0.16	0.5	87

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
109.	Minmini keerai	..	80.0	5.6	0.4	3.3	2.4	8.3	59	347	70	13.7	..	..	..	..	..
110.	Mint *Mentha spicata*	45	84.9	4.8	0.6	1.9	2.0	5.8	48	200	62	15.6	1620	0.05	0.26	1.0	27
111.	Modakathan keerai *Cardiospermum helicacabum*	..	83.3	4.7	0.6	2.3	..	9.1	61	..	..	..	..	..	..	..	..
112.	Mukarrate keerai *Boerhaavia repens*	..	84.5	6.1	0.9	1.3	..	7.2	61	667	99	18.4	..	..	..	..	27
113.	Mustard leaves *Brassica campestris var. sarson*	..	89.8	4.0	0.6	1.6	0.8	3.2	34	155	26	16.3	2622	0.03	..	..	33
114.	Nachukottai keerai ..	..	82.6	4.3	0.7	3.3	..	9.1	60	585	45	41.6	..	..	..	..	..
115.	Neem leaves, mature *Azadirachta indica*	..	59.4	7.1	1.0	3.4	6.2	22.9	129	510	80	17.1	1998	0.04	0	1.4	218
116.	Neem leaves, tender	100	59.4	11.6	3.0	2.6	2.2	21.2	158	130	190	25.3	2760	0.06	0	1.5	104
117.	Nerringi *Tribulus terrestris*	..	79.1	7.2	0.5	4.6	..	8.6	68	1550	82	9.2	..	..	..	..	41
118.	Pacharisi keerai *Euphorbia hirta*	..	78.1	4.7	1.7	3.2	..	12.3	83	546	106	21.2	..	..	..	..	44
119.	Panna keerai *Celosia sp.*	..	85.0	3.8	0.6	2.3	2.3	6.0	45	268	33	24	..	..	..	..	..
120.	Parsley *Petroselinum crispum*	82	74.6	5.9	1.0	3.2	1.8	13.5	87	390	175	17.9	1920	0.04	0.18	0.5	231
121.	Paruppu keerai *Portulaca oleracea*	51	90.5	2.4	0.6	2.3	1.3	2.9	27	111	45	14.8	2292	0.10	0.22	0.7	29
122.	Parwar sag *Trichosanthes dioica*	..	90.5	5.4	1.1	3.0	4.2	5.8	55	531	73	..	..	..	..	..	..

Proximate principles, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture *gm.*	Protein *gm.*	Fat *gm.*	Minerals *gm.*	Fibre *gm.*	Carbo-hydrates *gm.*	Energy *Kcal.*	Calcium *mg.*	Phosphorus *mg.*	Iron *mg.*	Carotene *µg.*	Thiamine *mg.*	Riboflavin *mg.*	Niacin *mg.*	Vitamin C *mg.*
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
123.	Pasarai keerai *Portulaca sp.*	..	86.0	1.7	0.4	1.8	2.2	7.9	42	148	25	58.2	..	..	..	..	..
124.	Patua sag *Corchorus capsularis*	..	81.4	5.1	1.1	2.7	1.6	8.1	63	241	93	..	..	..	..	..	..
125.	Ponnanganni *Alternanthera sessilis*	..	77.4	5.0	0.7	2.5	2.8	11.6	73	510	60	16.7	1926	0	0.14	1.2	17
126.	Potato leaves *Solanum tuberosum*	..	88.0	4.4	0.9	1.8	1.3	3.6	40	120	50	..	..	..	..	..	..
127.	Puliara keerai	..	85.0	4.3	1.5	2.0	..	7.2	60	116	35	4.1	..	..	..	..	..
128.	Pumpkin leaves *Cucurbita maxima*	..	81.9	4.6	0.8	2.7	2.1	7.9	57	392	112	..	..	..	..	..	..
129.	Punnaku keerai *Corchorus acutangulus*	..	80.6	6.1	0.7	2.5	..	10.1	71	250	38	35.7	..	..	..	..	145
130.	Radish leaves *Raphanus sativus*	100	90.8	3.8	0.4	1.6	1.0	2.4	28	265	59	3.6	5295	0.18	0.47	0.8	81
131.	Rajagira leaves *Amaranthus paniculatus*	..	78.6	5.9	1.0	3.8	2.1	8.6	67	530	60	18.4	14190	0.01	0.24	1.1	81
132.	Rape leaves *Brassica napus*	..	84.9	5.1	0.4	2.5	1.2	5.9	48	370	110	12.5	1380	0.01	0.03	0.9	65
133.	Rape leaves (dried) *Brassica napus*	..	7.4	27.0	2.9	15.3	6.7	40.7	297	3095	500	..	..	..	..	..	..

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
134.	Safflower leaves *Carthamus tinctorius*	66	91.1	2.5	0.6	1.3	..	4.5	33	185	35	5.7	3540	0.04	0.10	0	15
135.	Saravallai keerai *Trianthema monogyna*	..	91.3	2.0	0.4	2.2	0.9	3.2	24	100	30	38.5	..	..	..	..	70
136.	Sarli sag *Vangueria spinosa*	..	76.9	4.0	1.1	1.6	1.5	14.9	86	127	51	..	..	..	..	..	..
137.	Sarli sag (dried) *Vangueria spinosa*	..	7.5	7.7	6.1	7.7	13.4	57.6	316	1400	80	..	..	..	..	..	..
138.	Seemai ponnanganni *Alternanthera sp.*	..	85.7	3.3	0.8	2.7	..	7.5	50	322	29	16.8	..	..	..	..	..
139.	Shepu .. .. *Peucedanum graveolens*	..	88.0	3.0	0.5	2.2	1.1	5.2	37	190	42	17.4	7182	0.03	0.13	0.20	25
140.	Sinduar sag .. .. *Celosia argentea*	..	88.0	2.0	0.7	2.0	1.5	5.8	38	323	38	..	..	..	..	..	..
141.	Sinduar sag (wild) *Allmania nudiflora*	..	87.4	1.1	0.8	2.6	3.7	4.4	29	104	40	..	..	..	..	..	..
142.	Siru keerai .. .. *Amaranthus polygonoides*	..	90.0	2.8	0.3	2.1	..	4.8	33	251	55	27.3	..	..	..	..	..
143.	Sonchal sag .. .. *Malva parviflora*	100	86.2	4.3	0.6	2.1	1.2	5.6	45	300	60	19.5	2490	..	..	0.2	79
144.	Spinach .. .. *Spinacia oleracea*	87	92.1	2.0	0.7	1.7	0.6	2.9	26	73	21	10.9	5580	0.03	0.26	0.5	28
145.	Soya leaves .. .. *Glycine max*	..	79.5	6.0	0.5	3.2	..	10.8	72	180	190	8.0	..	..	0.16	..	..
146.	Susni sag .. .. *Marsilea minuta*	..	86.9	3.7	1.4	2.1	1.3	4.6	46	53	91	..	..	..	..	..	..
147.	Sweet potato greens *Ipomoea batatas*	.. 100	80.7	4.2	0.8	2.2	2.4	9.7	63	360	60	10.0	750	0.07	0.24	1.7	27

Proximate principles, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
148.	Table radish leaves .. *Raphanus sativus*	49	89.1	3.9	0.6	1.6	0.6	4.2	38	310	60	18.0	5742	0.18	0.35	5.5	106
149.	Tamarind leaves, tender .. *Tamarindus indicus*	100	70.5	5.8	2.1	1.5	1.9	18.2	115	101	140	5.2	250	0.24	0.17	4.1	3
150.	Tamarind leaves, tender, dried .. *Tamarindus indicus*	..	8.9	8.6	3.0	8.5	10.1	60.9	305	1485	124	..	..	..	..	..	..
151.	Thoduvalai keerai .. .. *Solanum sp.*	..	84.7	3.9	0.7	3.8	2.3	4.6	40	334	52	5.0	..	..	..	..	..
152.	Thuthi keerai	..	75.0	6.7	1.0	4.4	..	12.9	87	550	117	11.3	..	..	..	..	..
153.	Turnip greens .. .. *Brassica rapa*	51	81.9	4.0	1.5	2.2	1.0	9.4	67	710	60	28.4	9396	0.31	0.57	5.4	180
154.	Utarba	..	85.9	4.2	0.6	1.7	2.0	5.6	45	254	78	..	..	..	..	..	..
155.	Vadhanarayanan keerai	..	75.0	7.7	1.1	1.8	..	14.4	98	299	99	8.9	..	..	..	..	..
156.	Veethi keerai	..	72.2	7.5	0.7	4.0	2.2	13.4	90	366	62	11.5	..	..	..	..	..
157.	Velai keerai .. .. .. *Hydrolea sp.*	..	80.0	6.5	0.8	3.9	..	8.8	68	778	100	31.6	..	..	..	..	..
158.	Vella keerai .. .. .. *Cleome viscosa*	..	80.4	5.6	1.9	3.8	..	8.3	73	881	73	24.4	..	..	..	..	203

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
159.	Vellari keerai	..	84.5	2.1	0.5	2.7	4.2	6.0	37	224	32	68.8	..	..	..	..	..
160.	Water cress	45	89.2	2.9	0.2	2.2	0.6	4.9	33	290	140	4.6	2803	0.12	0.38	0.8	13
	Nasturtium officinale																
	ROOTS AND TUBERS																
161.	Arwa gadda	..	74.3	1.4	0.1	0.6	..	23.6	101	30	20	2.2	..	..	..	..	..
162.	Banana rhizome	35	85.1	0.4	0.2	1.4	1.1	11.8	51	25	10	1.1	16	0	0.03	0.2	1
	Musa paradisiaca																
163.	Beet root	85	87.7	1.7	0.1	0.8	0.9	8.8	43	18.3	55	1.0	0	0.04	0.09	0.4	10
	Beta vulgaris																
164.	Bokwa	..	79.6	2.9	0.3	0.8	0.9	15.5	76	25	53	..	..	..	..	..	..
	Dioscorea pentaphylla																
165.	Budhia	..	66.5	0.7	0.4	0.9	1.6	29.9	126	200	40	..	..	..	..	..	..
	Melothria heterophylla																
166.	Canna, edible	73	73.0	1.1	0.4	1.0	0.5	24.0	104	20	25	0.8	0	0.06	0.06	1.7	5
	Canna edulis																
167.	Carrot	95	86.0	0.9	0.2	1.1	1.2	10.6	48	80	530	2.2	1890	0.04	0.02	0.6	3
	Daucus carota																
168.	Chumbia	..	66.7	1.8	0.2	1.0	1.5	28.8	124	52	49	..	..	..	..	..	..
	Dioscorea hamiltonii																
169.	Churkia	..	83.7	1.6	0.1	0.6	1.2	12.8	59	19	38	..	..	..	..	..	..
	Dioscorea glabra																
170.	Colocasia	..	73.1	3.0	0.1	1.7	1.0	21.1	97	40	140	1.7	24	0.09	0.03	0.4	0
	Colocasia antiquorum																
171.	Epidong sanga	..	91.6	2.2	0.2	1.6	2.7	1.7	17	277	59	..	..	..	..	..	..
	Peucedanum nagpurense																

Proximate principles, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene μg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
172.	Garmar *Coleus barbatus*	..	87.4	0.3	0.2	0.7	..	11.4	49	153	13	0.6	93	0.04	0.05	0.4	0
173.	Goti gadde	69	44.1	7.5	0.3	1.5	0.8	45.8	216	60	204	13.9	0	0.31	0.25	0.6	9
174.	Jipoo sanga *Habenaria commelinifolia*	..	94.1	0.6	0.1	0.2	0.4	4.6	22	11	7	..	..	..	..	..	..
175.	Khamealu *Dioscorea alata*	..	79.6	1.3	0.1	0.8	0.1	18.1	79	16	31	0.5	..	..	..	..	..
176.	Lotus root *Nelumbium nelumbo*	..	85.9	1.7	0.1	0.2	0.8	11.3	53	21	74	0.4	..	0.10	..	..	22
177.	Mango ginger *Curcuma amada*	87	85.0	1.1	0.7	1.4	1.3	10.5	53	25	90	2.6	20	0.01	0.03	0	1
178.	Moor sanga *Butea frondosa*	..	45.4	2.1	0.3	0.6	1.6	50.0	211	25	21	..	..	..	..	..	..
179.	Murum sanga *Dioscorea spinosa*	..	82.5	1.4	0.1	0.6	0.7	14.7	65	24	24	..	..	..	..	..	..
180.	Nulu gadda	..	76.8	1.1	0.2	0.5	..	21.4	92	70	20	1.4	..	..	0.01	0.4	11
181.	Ochen sanga *Momordica cochinchinensis* ..	..	88.6	1.5	0.1	1.1	1.1	7.6	37	64	89	..	..	..	..	..	..
182.	Onion, big *Allium cepa*	95	86.6	1.2	0.1	0.4	0.6	11.1	50	46.9	50	0.7	0	0.08	0.01	0.4	11

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
183.	Onion, small .. .. .. *Allium cepa*	..	84.3	1.8	0.1	0.6	0.6	12.6	59	40	60	1.2	15	0.08	0.02	0.5	2
184.	Parsnip .. .. .. *Pastinaca sativa*	..	72.4	1.3	0.3	1.1	1.7	23.2	101	50	40	0.5	18	0.06	..	0.4	16
185.	Potato .. .. 85 *Solanum tuberosum*	74.7	1.6	0.1	0.6	0.4	22.6	97	10	40	0.7	24	0.10	0.01	1.2	17
186.	Radish, pink .. .. 98 *Raphanus sativus*	90.8	0.6	0.3	0.9	0.6	6.8	32	50	20	0.5	3	0.06	0.02	0.4	17
187.	Radish, rat-tailed .. .. *Raphanus sativus*	92.3	1.3	0.3	0.7	1.1	4.3	25	78	24	..	..	..	..	..	..
188.	Radish, table .. .. 100 *Raphanus sativus*	94.9	0.5	0.1	0.7	0.6	3.2	16	20	20	1.0	4	0.02	0.03	1.4	21
189.	Radish, white .. .. 99 *Raphanus sativus*	94.4	0.7	0.1	0.6	0.8	3.4	17	35	22	0.4	3	0.06	0.02	0.5	15
190.	Song .. .. .. *Dioscorea sp.*	65.0	2.3	0.1	1.0	0.7	30.9	134	39	64	..	..	..	..	..	..
191.	Sweet potato .. .. 97 *Ipomoea batatas*	68.5	1.2	0.3	1.0	0.8	28.2	120	46	50	0.8	6	0.08	0.04	0.7	24
192.	Tapioca .. .. .. *Manihot esculenta*	59.4	0.7	0.2	1.0	0.6	38.1	157	50	40	0.9	..	0.05	0.10	0.3	25
193.	Tapioca chips, dried .. 100 *Manihot esculenta*	12.0	1.3	0.3	2.0	1.8	82.6	338	91	70	3.6	0	0.23	0.10	1.4	0
194.	Turnip .. .. 65 *Brassica rapa*	91.6	0.5	0.2	0.6	0.9	6.2	29	30	40	0.4	0	0.04	0.04	0.5	43
195.	Turum sanga .. .. .. *Curculigo orchioides*	66.4	1.9	0.4	1.7	1.6	28.0	123	342	19	..	..	..	..	..	..
196.	Usingid	80.0	1.9	0.9	2.6	3.6	11.0	60	520	42	..	..	..	..	..	..
197.	Yam, elephant .. .. .. *Amorphophallus campanulatus*	78.7	1.2	0.1	0.8	0.8	18.4	79	50	34	0.6	260	0.06	0.07	0.7	0

Proximate princples, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
198.	Yam, ordinary .. .. *Typhonium trilobatum*	92	69.9	1.4	0.1	1.6	1.0	26.0	111	35	20	1.3	78	0.07	..	0.7	..
199.	Yam, wild .. .. *Dioscorea versicolor*	89	70.4	2.5	0.3	1.4	1.0	24.4	110	20	74	1.0	565	0.19	0.47	1.2	1
200.	Water lily, red .. .. *Nymphaea nouchali*	..	49.1	4.1	0.3	1.6	1.5	43.4	193	65	217	..	..	..	..	..	..
201.	Water lily, white .. .. *Nymphaea nouchali*	..	62.5	3.1	0.3	1.3	1.1	31.7	142	76	220	..	..	..	..	..	..
	OTHER VEGETABLES																
202.	Agathi flowers .. .. .. *Sesbania aegyptiaca*	..	92.9	1.0	0.5	0.4	0.8	4.4	26	9	5	..	..	..	..	..	..
203.	Amaranth stem .. .. .. *Amaranthus gangeticus*	..	92.5	0.9	0.1	1.8	1.2	3.5	19	260	30	1.8	255	0.01	0.18	0	10
204.	Artichoke .. .. .. *Cynara scolymus*	..	77.3	3.6	0.1	1.8	1.2	16.0	79	120	100	2.3	37	0.23	0.01	..	0
205.	Ash gourd .. .. 67 *Benincasa hispida*	..	96.5	0.4	0.1	0.3	0.8	1.9	10	30	20	0.8	0	0.06	0.01	0.4	1
206.	Bagnaha .. .. .. *Capparis horrida*	..	67.0	6.1	3.8	2.0	9.6	11.5	105	64	81	..	..	..	..	..	..
207.	Beans, scarlet runner .. 59 *Phaseolus coccineus*	58.3	7.4	1.0	1.6	1.9	29.8	158	50	160	2.6	34	0.34	0.19	0	27	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
208.	Bitter gourd .. .. *Momordica charantia*	97	92.4	1.6	0.2	0.8	0.8	4.2	25	20	70	1.8	126	0.07	0.09	0.5	88
209.	Bitter gourd, small .. *Momordica charantia*	93	83.2	2.1	1.0	1.4	1.7	10.6	60	23	38	2.0	126	0.07	0.06	0.4	96
210.	Borooee, raw .. .. *Gardenia gummifera*	..	81.1	1.5	0.2	0.8	2.3	14.1	64	30	18	..	..	..	..	..	6
211.	Bottle gourd .. .. *Lagenaria vulgaris*	86	96.1	0.2	0.1	0.5	0.6	2.5	12	20	10	0.7	0	0.03	0.01	0.2	0
212.	Brinjal .. .. *Solanum melongena*	91	92.7	1.4	0.3	0.3	1.3	4.0	24	18	47	0.9	74	0.04	0.11	0.9	12
213.	Broad beans .. .. *Vicia faba*	88	85.4	4.5	0.1	0.8	2.0	7.2	48	50	64	1.4	9	0.08	..	0.8	12
214.	Cauliflower .. .. *Brassica oleracea var. botrytis*	70	90.8	2.6	0.4	1.0	1.2	4.0	30	33	57	1.5	30	0.04	0.10	1.0	56
215.	Celery stalks .. .. *Apium graveolens var. dulce*	..	93.5	0.8	0.1	0.9	1.2	3.5	18	30	38	4.8	520	0.12	0.05	0.3	6
216.	Chaltha .. .. *Dillenia indica*	..	82.3	0.8	0.2	0.8	2.5	13.4	59	16	26	..	..	..	..	..	..
217.	Cho-cho-marrow .. .. *Sechium edule*	..	92.5	0.7	0.1	0.4	0.6	5.7	27	140	30	0.6	0	0	0.04	0.4	4
218.	Cluster beans .. .. *Cyamopsis tetragonoloba*	..	81.0	3.2	0.4	1.4	3.2	10.8	16	130	57	4.5	198	0.09	0.03	0.6	49
219.	Colocasia stem .. .. *Colocasia antiquorum*	86	94.0	0.3	0.3	1.2	0.6	3.6	18	60	20	0.5	104	0.07	0.07	0.1	3
220.	Cowpea pods .. .. *Vigna catjang*	..	85.3	3.5	0.2	0.9	2.0	8.1	48	72	59	2.5	564	0.07	0.09	0.9	14
221.	Cucumber .. .. *Cucumis sativus*	83	96.3	0.4	0.1	0.3	0.4	2.5	13	10	25	1.5	0	0.03	0	0.2	7

Proximate principles, minerals and vitamins —*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
222.	Double beans *Faba vulgaris*	.. ..	..	73.8	8.3	0.3	1.0	4.3	12.3	85	40	140	2.3	..	.	..	..	22
223.	Drumstick *Moringa oleifera*	.. ..	83	86.9	2.5	0.1	2.0	4.8	3.7	26	30	110	5.3	110	0.05	0.07	0.2	120
224.	Drumstick flowers *Moringa oleifera*	.. ..	..	85.9	3.6	0.8	1.3	1.3	7.1	50	51	90	..	..	..	..	..	..
225.	Field beans, tender *Dolichos lablab*	..	93	86.1	3.8	0.7	0.9	1.8	6.7	48	210	68	1.7	187	0.10	0.06	0.7	9
226.	Figs, red *Ficus cunia*	.. ..	..	79.4	1.2	0.6	1.6	6.4	10.8	53	187	39	..	..	..	..	..	..
227.	French beans *Phaseolus vulgaris*	.. ..	94	91.4	1.7	0.1	0.5	1.8	4.5	26	50	28	1.7	132	0.08	0.06	0.3	24
228.	Ghosala *Luffa cylindrica*	.. ..	..	93.2	1.2	0.2	0.5	2.0	2.9	18	36	19	1.1	120	0.02	0.06	0.4	0
229.	Giant chillies (capsicum) *Capsicum annuum var. grossa*	..	97	92.4	1.3	0.3	0.7	1.0	4.3	24	10	30	1.2	427	0.55	0.05	0.1	137
230.	Ipomoea stems *Ipomoea reptans*	.. ..	..	93.7	0.9	0.2	1.8	..	3.4	19	80	30	0.8	..	..	..	..	..
231.	Jack, tender *Artocarpus heterophyllus*	.. ..	..	84.0	2.6	0.3	0.9	2.8	9.4	51	30	40	1.7	0	0.05	0.04	0.2	14
232.	Kandan kathiri *Solanum xanthocarpum*	.. ..	..	75.5	3.1	0.8	1.6	14.2	4.8	39	100	90	1.2	..	..	..	..	..

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
233.	Kankoda .. .. .. *Momordica dioica*	..	84.1	3.1	1.0	1.1	3.0	7.7	52	33	42	4.6..	1620	0.05	0.18	0.6	..
234.	Karonda, fresh .. .. *Carissa carandas*	98	91.0	1.1	2.9	0.6	1.5	2.9	42	21	28	..	..	..	..	..	..
235.	Karonda, dry .. .. *Carissa carandas*	..	18.2	2.3	9.6	2.8	..	67.1	364	160	60	39.1	..	..	..	..	..
236.	Kheksa .. .. .. *Momordica cochinchinensis*	..	90.4	0.6	0.1	0.9	1.6	6.4	29	27	38	..	..	..	..	..	..
237.	Kovai .. .. *Coccinia cordifolia*	96	93.5	1.2	0.1	0.5	1.6	3.1	18	40	30	1.4	156	0.07	0.08	0.7	15
238.	Knol-khol .. .. *Brassica oleracea var. caulorapa*	74	92.7	1.1	0.2	0.7	1.5	3.8	21	20	35	0.4	21	0.05	0.09	0.5	85
239.	Ladies fingers .. .. *Abelmoschus esculentus*	84	89.6	1.9	0.2	0.7	1.2	6.4	35	66	56	1.5	52	0.07	0.10	0.6	13
240.	Lakuch, raw .. .. *Artocarpus lakoocha*	..	89.4	1.6	1.2	1.1	2.8	13.9	73	67	25	..	..	..	..	..	..
241.	Leeks .. .. *Allium porrum*	..	78.9	1.8	0.1	0.7	1.3	17.2	77	50	70	2.3	18	0.23	..	..	11
242.	Lotus stem, dry .. .. *Nelumbium nelumbo*	100	9.5	4.1	1.3	8.7	25.0	51.4	234	405	128	60.6	0	0.82	1.21	1.9	3
243.	Mango, green .. .. *Mangsfera indica*	72	87.5	0.7	0.1	0.4	1.2	10.1	44	10	19	5.4	90	0.04	0.01	0.2	3
244.	Mogra, red	..	91.8	2.3	0.5	1.0	1.3	3.1	26	97	25	3.9	300	0.03	0.04	0.5	..
245.	Mogra, green	..	91.8	1.6	0.4	0.6	1.2	4.4	28	98	34	2.5	654	0.04	0.03	0.4	74
246.	Nisorha flowers .. .. *Cordia dichotoma*	..	79.6	4.7	0.5	2.6	3.3	9.3	61	1740	116	..	..	..	..	..	..

Proximate principles, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
247.	Onion stalks .. .. *Allium cepa*	100	87.6	0.9	0.2	0.8	1.6	8.9	41	50	50	7.5	595	0	0.03	0.3	17
248.	Papaya, green .. .. *Carica papaya*	..	92.0	0.7	0.2	0.5	0.9	5.7	27	28	40	0.9	0	0.01	0.01	0.1	12
249.	Parwar .. .. *Trichosanthes dioica*	95	92.0	2.0	0.3	0.5	3.0	2.2	20	30	40	1.7	153	0.05	0.06	0.5	29
250.	Peas .. .. *Pisum sativum*	53	72.1	7.2	0.1	0.8	4.0	15.9	93	20	139	1.5	83	0.25	0.01	0.8	9
251.	Pink beans .. .. *Phaseolus sp.*	94	86.8	3.1	0.4	0.6	2.1	7.0	44	54	70	1.5	453	0.06	0.02	0.6	12
252.	Plantain flower .. .. *Musa sapientum*	43	89.9	1.7	0.7	1.3	1.3	5.1	34	32	42	1.6	27	0.05	0.02	0.4	16
253.	Plantain, green .. .. *Musa sapientum*	58	83.2	1.4	0.2	0.5	0.7	14.0	64	10	29	0.6	30	0.05	0.02	0.3	24
254.	Plantain stem .. .. *Musa sapientum*	..	88.3	0.5	0.1	0.6	0.8	9.7	42	10	10	1.1	0	0.02	0.01	0.2	7
255.	Pumpkin .. .. *Cucurbita maxima*	79	92.6	1.4	0.1	0.6	0.7	4.6	25	10	30	0.7	50	0.06	0.04	0.5	2
256.	Pumpkin flowers .. .. *Cucurbita maxima*	..	89.1	2.2	0.8	1.4	0.7	5.8	39	120	60	..	..	..	..	..	..
257.	Rape plant, stem .. .. *Brassica napus*	..	91.4	3.1	0.1	1.4	..	4.0	29	100	100	1.2	..	..	..	..	..

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
258.	Redgram, tender *Cajanus cajan* ..	72	65.1	9.8	1.0	1.0	6.2	16.9	116	57	164	1.1	469	0.32	0.33	3.0	25
259.	Rhubarb stalks .. *Rheum emodi* ..	..	92.7	1.1	0.5	1.1	0.3	4.3	26	120	10	2.2	..	..	..	..	37
260.	Ridge gourd .. *Luffa acutangula* ..	82	95.2	0.5	0.1	0.3	0.5	3.4	17	18	26	0.5	33	..	0.01	0.2	5
261.	Sanga ka phal .. *Dioscorea puber* ..	..	73.4	1.5	0.1	0.9	1.0	23.1	99	16	48	..	..	..	..	..	..
262.	Sannhemp flowers *Crotalaria juncea* ..	..	78.9	4.8	0.6	1.4	3.9	10.4	66	200	100	..	..	..	..	..	..
263.	Silk cotton flowers *Bombax malabaricum* ..	..	86.4	1.5	0.3	0.7	1.6	9.5	47	22	45	..	..	..	..	..	..
264.	Snake gourd .. *Trichosanthes anguina* ..	98	94.6	0.5	0.3	0.5	0.8	3.3	18	26	20	0.3	96	0.04	0.06	0.3	0
265.	Spinach stalks .. *Spinacia oleracea* ..	..	93.4	0.9	0.1	1.8	..	3.8	20	90	20	1.6	..	..	..	..	3
266.	Sundakai, dry .. *Solanum torvum* ..	..	12.3	8.3	1.7	5.1	17.6	55.0	269	390	180	22.2	450	..	..	..	0
267.	Sword beans .. *Canavalia gladiata* ..	98	87.2	2.7	0.2	0.6	1.5	7.8	44	60	40	2.0	24	0.08	0.08	0.5	12
268.	Tetrolobar bean .. *Lotus tetragonolobus* ..	..	90.6	1.9	0.4	0.5	1.8	4.8	30	30	20	..	..	..	..	..	..
269.	Tinda, tender .. *Citrullus vulgaris var. fistulosus* ..	99	93.5	1.4	0.2	0.5	1.0	3.4	21	25	24	0.9	13	0.04	0.08	0.3	18
270.	Tomato, green .. *Lycopersicon esculentum* ..	98	93.1	1.9	0.1	0.6	0.7	3.6	23	20	36	1.8	192	0.07	0.01	0.4	31
271.	Vegetable marrow *Cucurbita pepo* ..	94	94.8	0.5	0.1	0.3	0.8	3.5	17	10	30	0.6	..	0.02	0	0.4	18

Proximate principles, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture *gm.*	Protein *gm.*	Fat *gm.*	Minerals *gm.*	Fibre *gm.*	Carbo-hydrates *gm.*	Energy *Kcal.*	Calcium *mg.*	Phosphorus *mg.*	Iron *mg.*	Carotene *µg.*	Thiamine *mg.*	Riboflavin *mg.*	Niacin *mg.*	Vitamin C *mg.*
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
272.	Water chestnut, fresh *Trapa bispinosa*	38	70.0	4.7	0.3	1.1	0.6	23.3	115	20	150	0.8	12	0.05	0.07	0.6	9
273.	Water chestnut, dry *Trapa bispinosa*	..	13.8	13.4	0.8	3.1	..	68.9	336	70	440	2.4	..	..	..	..	..
274.	Waterlily flowers *Nymphaea nouchali*	..	90.8	1.6	0.6	0.7	0.9	5.4	33	29	18	..	..	..	..	..	..
	NUTS AND OILSEEDS																
275.	Almond *Prunus amygdalus*	..	5.2	20.8	58.9	2.9	1.7	10.5	655	230	490	4.5	0	0.24	0.57	4.4	0
276.	Cashewnut *Anacardium occidentale*	..	5.9	21.2	46.9	2.4	1.3	22.3	596	50	450	5.0	60	0.63	0.19	1.2	0
277.	Chilgoza *Pinus gerardiana*	..	4.0	13.9	49.3	2.8	1.0	29.0	615	91	494	3.6	..	0.32	0.30	3.6	0
278.	Coconut, dry *Cocos nucifera*	..	4.3	6.8	62.3	1.6	6.6	18.4	662	400	210	2.7	0	0.08	0.01	3.0	7
279.	Coconut, fresh *Cocos nucifera*	.. 100	36.3	4.5	41.6	1.0	3.6	13.0	444	10	240	1.7	0	0.05	0.10	0.8	1
280.	Garden cress seeds *Lepidium sativum*	.. 100	3.2	25.3	24.5	6.4	7.6	33.0	454	377	723	100.0	27	0.59	0.61	14.3	0

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
281.	Gingelly seeds .. .. *Sesamum indicum*	100	5.3	18.3	43.3	5.2	2.9	25.0	563	1450	570	10.5	60	1.01	0.34	4.4	0
282.	Groundnut .. .. *Arachis hypogaea*	73	3.0	25.3	40.1	2.4	3.1	26.1	567	90	350	2.8	37	0.90	0.13	19.9	0
283.	Groundnut, roasted .. *Arachis hypogaea*	69	1.7	26.2	39.8	2.5	3.1	26.7	570	77	370	3.1	0	0.39	0.13	22.1	0
284.	Jungli badam .. .. *Sterculia foetida*	10	35.6	11.4	35.5	2.4	..	..	..	33	415	1.7	0	0.06	0.08	1.1	5
285.	Linseed seeds .. .. *Linum usitatissimum*	99	6.5	20.3	37.1	2.4	4.8	28.9	530	170	370	2.7	30	0.23	0.07	1.0	0
286.	Mustard seeds .. .. .. *Brassica nigra*	..	8.5	20.0	39.7	4.2	1.8	23.8	541	490	700	17.9	162	0.65	0.26	4.0	0
287.	Niger seeds .. .. .. *Guizotia abyssinica*	..	4.2	23.9	39.0	4.9	10.9	17.1	515	300	224	56.6	..	0.07	0.97	8.4	0
288.	Oysternut .. .. .. *Telfairea pedata*	..	4.4	29.7	63.3	2.6	..	0	689	10	570	4.1	..	..	..	..	..
289.	Pistachio nut .. .. .. *Pistacia vera*	..	5.6	19.8	53.5	2.8	2.1	16.2	626	140	430	7.7	144	0.67	0.28	2.3	..
290.	Piyal seeds .. .. 100 *Buchanania latifolia*		3.0	19.0	59.1	3.0	3.8	12.1	656	279	528	8.5	0	0.69	0.53	1.5	5
291.	Safflower seeds .. .. .. *Carthamus tinctorius*	..	5.5	13.5	25.6	2.6	34.9	17.9	356	236	823	..	..	..	..	..	..
292.	Sunflower seeds .. .. 52 *Helianthus annuus*		5.5	19.8	52.1	3.7	1.0	17.9	620	280	670	5.0	0	0.86	0.20	4.5	1
293.	Walnut .. .. 45 *Juglans regia*		4.5	15.6	64.5	1.8	2.6	11.0	687	100	380	4.8	6	0.45	0.40	1.0	0

Proximate principles, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	CONDIMENTS AND SPICES																
294.	Arisithippili ..	..	..	12.5	13.2	4.7	6.0	5.2	58.4	329	460	325	13.5	..	..	..	..	..
295.	Asafoetida .. *Ferula foetida*	..	..	16.0	4.0	1.1	7.0	4.1	67.8	297	690	50	22.2	4	0	0.04	0.3	0
296.	Cardamom .. *Elettaria cardamomum*	..	..	20.0	10.2	2.2	5.4	20.1	42.1	229	130	160	5.0	0	0.22	0.17	0.8	0
297.	Chillies, dry .. *Capsicum annuum*	..	..	10.0	15.9	6.2	6.1	30.2	31.6	246	160	370	2.3	345	0.93	0.43	9.5	50
298.	Chillies, green .. *Capsicum annuum*	..	90	85.7	2.9	0.6	1.0	6.8	3.0	29	30	80	1.2	175	0.19	0.39	0.9	111
299.	Cloves, dry .. *Syzygium aromaticum*	..	100	25.2	5.2	8.9	5.2	9.5	46.0	286	740	100	4.9	253	0.08	0.13	0	0
300.	Cloves, green .. *Syzygium aromaticum*	..	..	65.5	2.3	5.9	2.2	..	24.1	159	310	40	2.1	72	..	..	..	..
301.	Coriander .. *Coriandrum sativum*	..	..	11.2	14.1	16.1	4.4	32.6	21.6	288	630	393	17.9	942	0.22	0.35	1.1	0
302.	Cumin seeds .. *Cuminum cyminum*	..	..	11.9	18.7	15.0	5.8	12.0	36.6	356	1080	511	31.0	522	0.55	0.36	2.6	3
303.	Fenugreek seeds .. *Trigonella foenum-graecum*	..	..	13.7	26.2	5.8	3.0	7.2	44.1	333	160	370	14.1	96	0.34	0.29	1.1	0

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
304.	Garlic, dry .. .. *Allium sativum*	85	62.0	6.3	0.1	1.0	0.8	29.8	145	30	310	1.3	0	0.06	0.23	0.4	13
305.	Ginger, fresh .. .. .. *Zingiber officinale*	..	80.9	2.3	0.9	1.2	2.4	12.3	67	20	60	2.6	40	0.06	0.03	0.6	6
306.	Kandanthippili .. .. *Piper longum*	..	12.2	6.4	2.3	4.8	8.5	65.8	310	1230	190	62.1	..	..	..	..	..
307.	Lime peel .. .. .. *Citrus medica var. acida*	..	66.5	1.8	0.5	1.8	..	29.4	129	710	60	2.7	..	..	..	..	..
308.	Mace .. .. .. *Myristica fragrans*	..	15.9	6.5	24.4	1.6	3.8	47.8	437	180	100	12.6	3027	0.25	0.42	1.4	0
309.	Nutmeg .. .. .. *Myristica fragrans*	..	14.3	7.5	36.4	1.7	11.6	28.5	472	120	240	4.6	0	0.33	0.01	1.4	0
310.	Nutmeg rind .. .. .. *Myristica fragrans*	..	86.8	1.0	0.4	0.6	..	11.2	52	40	10	2.0	4	..	..	..	..
311.	Omum .. .. .. *Trachyspermum ammi*	..	7.4	17.1	21.8	7.9	21.2	24.6	363	1525	443	27.7	71	0.21	0.28	2.1	..
312.	Pepper, dry .. .. *Piper nigrum*	95	13.2	11.5	6.8	4.4	14.9	49.2	304	460	198	16.8	1080	0.09	0.14	1.4	..
313.	Pepper, green .. .. *Piper nigrum*	81	70.6	4.8	2.7	1.8	6.4	13.7	98	270	70	2.4	540	0.05	0.04	0.2	1
314.	Tamarind pulp .. .. .. *Tamarindus indica*	..	20.9	3.1	0.1	2.9	5.6	67.4	283	170	110	10.9	60	..	0.07	0.7	3
315.	Turmeric .. .. *Curcuma domestica*	100	13.1	6.3	5.1	3.5	2.6	69.4	349	150	282	14.8	30	0.03	0	2.3	0
	FRUITS																
316.	Ambada .. .. .. *Spondias mangifera*	..	90.3	0.7	3.0	0.5	1.0	4.5	48	36	11	3.9	270	0.02	0.02	0.3	21

Proximate principles, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible % portion	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
317.	Amla *Emblica officinalis*	89	81.8	0.5	0.1	0.5	3.4	13.7	58	50	20	1.2	9	0.03	0.01	0.2	600
318.	Apple *Malus sylvestris*	90	84.6	0.2	0.5	0.3	1.0	13.4	59	10	14	1.0	0	..	..	0	1
319.	Apricots, fresh *Prunus armeniaca* ..	86	85.3	1.0	0.3	0.7	1.1	11.6	53	20	25	2.2	2160	0.04	0.13	0.6	6
320.	Apricots, dried *Prunus armeniaca*	93	19.4	1.6	0.7	2.8	2.1	73.4	306	110	70	4.6	58	0.22	..	2.3	2
321.	Avocado pear *Persea americana*	..	73.6	1.7	22.8	1.1	..	0.8	215	10	80	0.7	..	..	..	..	..
322.	Bael fruit *Aegle marmelos*	64	61.5	1.8	0.3	1.7	2.9	31.8	137	85	50	0.6	55	0.13	0.03	1.1	8
323.	Baincha *Flacourtia indica*	..	67.8	1.7	1.8	1.3	4.7	22.7	114	100	100	..	..	..	..	..	..
324.	Bamboo fruit *Bambusa arundinacea*	..	56.3	3.9	0.1	1.6	3.9	34.2	153	10	110	1.5	11	0.09	0.09	..	1
325.	Banana, ripe *Musa paradisiaca*	71	70.1	1.2	0.3	0.8	0.4	27.2	116	17	36	0.9	78	0.05	0.08	0.5	7
326.	Banyan tree figs *Ficus bengalensis*	..	74.1	1.7	2.0	1.9	8.5	11.8	72	364	43	..	..	..	..	..	..
327.	Bilimbi *Averrhoa bilimbi*	100	94.4	0.5	0.3	0.3	1.0	3.5	19	15	10	1.2	18	0.09	0.04	0.6	32

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
328.	Blackberry .. .. *Rubus fruticosus*	100	87.2	1.3	0.5	0.5	3.8	6.7	37	30	20	4.3	7	..	..	2.0	9
329.	Borooee .. .. *Gardenia gummifera*	..	74.1	2.0	0.3	1.3	4.7	17.6	81	68	64	..	..	..	..	..	..
330.	Bread fruit .. .. *Artocarpus altilis*	..	79.5	1.5	0.2	0.9	2.1	15.8	71	40	30	0.5	9	0.04	0.07	..	21
331.	Bullock's heart .. .. *Annona reticulata*	72	76.8	1.4	0.2	0.7	5.2	15.7	70	10	10	0.6	67	..	0.07	0.6	5
332.	Cape gooseberry .. *Physalis peruviana*	87	82.9	1.8	0.2	0.8	3.2	11.1	53	10	67	2.0	1428	0.05	0.02	0.3	49
333.	Carambola .. .. .. *Averrhoa carambola*	..	91.9	0.7	0.1	0.4	0.8	6.1	28	4	11	..	..	..	..	..	..
334.	Cashew fruit .. .. *Anacardium occidentale*	77	86.3	0.2	0.1	0.2	0.9	12.3	51	10	10	0.2	23	0.02	0.05	0.4	180
335.	Cherries, red .. .. *Prunus cerasus*	88	83.4	1.1	0.5	0.8	0.4	13.8	64	24	25	1.3	0	0.08	0.08	0.3	7
336.	Cherimoyer .. .. *Annona cherimolia*	73	76.4	1.3	0.3	0.3	1.5	20.2	89	30	20	0.4	2	0.03	0.21	1.0	7
337.	Currants, black	98	18.4	2.7	0.5	2.2	1.0	75.2	316	130	110	8.5	21	0.03	0.14	0.4	1
338.	Dates, dried .. .. *Phoenix dactylifera*	86	15.3	2.5	0.4	2.1	3.9	75.8	317	120	50	7.3	26	0.01	0.02	0.9	3
339.	Dates, fresh .. .. *Phoenix dactylifera*	..	59.2	1.2	0.4	1.7	3.7	33.8	144	22	38	..	..	..	..	..	..
340.	Durian .. .. *Durio zibethinus*	..	58.0	2.8	3.9	1.2	..	34.1	183	10	50	1.0	12	..	..	..	..
341.	Figs .. .. *Ficus carica*	99	88.1	1.3	0.2	0.6	2.2	7.6	37	80	30	1.0	162	0.06	0.05	0.6	5

Proximate princples, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
342.	Gab *Diospyros embryopteris*	.. ..	69.6	1.4	0.1	0.8	1.5	26.6	113	58	27	..	..	..	..	..	..
343.	Grapes, blue variety *Vitis vinifera*	.. 95	82.2	0.6	0.4	0.9	2.8	13.1	58	20	23	0.5	3	0.04	0.03	0.2	1
344.	Grapes, pale green variety *Vitis vinifera*	.. ..	79.2	0.5	0.3	0.6	2.9	16.5	71	20	30	0.5	0	..	..	0	1
345.	Grapefruit (Marsh's seedless) *Citrus paradisi*	..	88.5	1.0	0.1	0.4	..	10.0	45	30	30	0.2	..	0.12	0.02	0.3	..
346.	Grapefruit (Triumph) *Citrus paradisi*	.. ..	92.0	0.7	0.1	0.2	..	7.0	32	20	20	0.2	..	0.12	0.02	0.3	31 (Juice)
347.	Guava, country *Psidium guajava*	.. ..	81.7	0.9	0.3	0.7	5.2	11.2	51	10	28	1.4	0	0.03	0.03	0.4	212
348.	Guava, hill *Psidium cattleyanum*	.. .. ..	85.3	0.1	0.2	0.6	4.8	9.0	38	50	20	1.2	0	0.02	0.02	0.3	15
349.	Harfarowrie *Phyllanthus distichus*	.. .. ..	91.2	0.7	0.6	0.5	1.1	5.9	32	6	6	..	..	..	..	..	..
350.	Hoormed	.. .. ..	16.0	2.8	1.1	0.9	2.3	76.9	329	145	80	..	..	..	..	..	..
351.	Jack fruit *Artocarpus heterophyllus*	 30	76.2	1.9	0.1	0.9	1.1	19.8	88	20	41	0.5	175	0.03	0.13	0.4	7
352.	Jamb, safed *Eugenia malaccensis*	.. .. ..	93.5	0.1	0.4	0.1	2.2	3.7	19	17	3	0.1	..	0.01	0.02	0.2	30

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
353.	Jambu fruit .. .. *Syzygium cumini*	75	83.7	0.7	0.3	0.4	0.9	14.0	62	15	15	1.2	48	0.03	0.01	0.2	18
354.	Jurmata .. .. *Canthium didymum*	..	46.0	4.8	0.3	2.2	3.4	43.3	195	115	101	..	..	..	..	..	..
355.	Kesaur .. .. *Pachyrrhizus angulatus*	..	80.2	1.6	0.1	0.5	0.6	17.0	75	11	15	..	..	..	..	..	..
356.	Kila pazham .. .. *Vaccinium leschenaultii*	..	79.5	0.8	0.6	0.3	7.3	11.5	55	20	10	1.4	48	..	..	..	..
357.	Korukkapalli .. *Pithecellobium dulce*	60	79.2	2.7	0.4	0.7	1.0	16.0	78	14	49	1.0	0	0.22	0.06	1.6	108
358.	Kusum fruits .. .. *Schleichera trijuga*	..	86.2	1.5	0.8	1.0	0.6	9.9	53	15	42	..	..	..	..	..	..
359.	Lakuch .. .. *Artocarpus lakoocha*	76	82.1	0.7	1.1	.0.8	2.0	13.3	66	50	20	0.5	254	0.02	0.15	0.3	135
360.	Langsat .. .. *Lansium domesticum*	58	86.5	0.8	0.3	0.6	2.3	9.5	44	20	30	0.5	7	0.09	0.12	0	1
361.	Lemon .. .. *Citrus limon*	..	85.0	1.0	0.9	0.3	1.7	11.1	57	70	10	2.3	0	0.02 (Juice)	0.01 (Juice)	0.1 (Juice)	39 (Juice)
362.	Lemon, sweet .. .. *Citrus limetta*	79	90.5	0.7	0.3	0.5	0.7	7.3	35	30	20	0.7	0	..	0.04	0	45
363.	Lichi .. .. *Nephelium litchi*	68	84.1	1.1	0.2	0.5	0.5	13.6	61	10	35	0.7	0	0.02	0.06	0.4	31
364.	Lichies, bastard .. .. *Nephelium longana*	..	83.9	1.4	0.3	0.8	0.5	13.1	61	15	35	..	..	..	..	..	..
365.	Lime .. .. *Citrus aurantifolia*	..	84.6	1.5	1.0	0.7	1.3	10.9	59	90	20	0.3	15	0.02	0.03	0.1	63
366.	Lime, sweet, Malta ..	67	90.3	0.7	0.2	0.4	0.6	7.8	36	30	20	1.0	0	..	..	0	54
367.	Lime, sweet, musambi .. *Citrus sinensis*	71	88.4	0.8	0.3	0.7	0.5	9.3	43	40	30	0.7	0	..	..	0	50

Proximate principles, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
368.	Loquat .. *Eriobotrya japonica*	..	76	88.2	0.6	0.3	0.5	0.8	9.6	43	30	20	1.3	559	..	..	0	0
369.	Mahua, ripe .. *Bassia longifolia*	..	..	73.6	1.4	1.6	0.7	..	22.7	111	45	22	1.1	307	..	..	..	40
370.	Mango, ripe .. *Mangifera indica*	..	74	81.0	0.6	0.4	0.4	0.7	16.9	74	14	16	1.3	2743	0.08	0.09	0.9	16
371.	Mangosteen .. *Garcinia mangostana*	..	..	84.9	0.5	0.1	0.2	..	14.3	60	10	20	0.2	..	..	..	..	..
372.	Matasura, whole fruit .. *Antidesma ghesaembilla*	..	..	72.3	1.9	1.0	1.1	13.1	10.6	59	138	28	..	..	..	..	..	..
373.	Matasura, skin and pulp .. *Antidesma ghesaembilla*	..	..	84.1	2.3	1.6	1.2	1.7	9.1	60	16	22	..	..	..	..	..	..
374.	Melon, musk .. *Cucumis melo*	..	78	95.2	0.3	0.2	0.4	0.4	3.5	17	32	14	1.4	169	0.11	0.08	0.3	26
375.	Melon, water .. *Citrullus vulgaris*	..	78	95.8	0.2	0.2	0.3	0.2	3.3	16	11	12	7.9	0	0.02	0.04	0.1	1
376.	Mulberry .. *Morus sp.*	..	100	86.5	1.1	0.4	0.6	1.1	10.3	49	70	30	2.3	57	0.04	0.13	0.5	12
377.	Mulchari .. *Mimusops elengi*	..	..	54.7	1.8	1.0	2.3	4.3	35.9	160	212	30	..	..	..	..	..	..
378.	Neem fruit .. *Melia azadirachta*	..	..	81.9	1.3	1.0	0.7	..	15.1	75	25	41	..	..	..	..	..	..

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
379.	Nisorha .. .. .. *Cordia dichotoma*	..	82.5	1.8	1.0	2.2	0.3	12.2	65	40	60	..	..	..	..	..	..
380.	Orange .. .. *Citrus aurantium*	67	87.6	0.7	0.2	0.3	0.3	10.9	48	26	20	0.32	1104	..	..	..	30
381.	Orange juice .. .. .. *Citrus aurantium*	..	97.7	0.2	0.1	0.1	..	1.9	9	5	9	0.7	15	0.06	0.02	0.4	64
382.	Palmyra fruit, ripe (Mesocarp) *Borassua flabellifer*	..	77.2	0.7	0.2	0.7	0.5	20.7	87	9	33	..	..	..	..	..	..
383.	Palmyra fruit, tender .. *Borassus flabellifer*	70	92.3	0.6	0.1	0.2	0.3	6.5	29	10	20	0.5	0	0.01	0.01	0.2	4
384.	Paniyala .. .. .. *Flacourtia cataphracta*	..	77.7	0.5	0.1	0.8	1.0	19.9	83	43	25	..	..	..	..	..	..
385.	Papa .. .. .. *Gardenia latifolia*	..	46.9	3.7	3.1	1.9	9.5	34.9	182	24	91	..	..	..	..	..	..
386.	Papaya, ripe .. .. *Carica papaya*	75	90.8	0.6	0.1	0.5	0.8	7.2	32	17	13	0.5	666	0.04	0.25	0.2	57
387.	Passion fruit .. .. .. *Passiflora edulis*	..	76.3	0.9	0.1	0.7	9.6	12.4	54	10	60	2.0	54	0.07	0.14	1.6	25
388.	Passion fruit juice .. *Passiflora edulis*	100	89.0	1.2	0.2	0.7	1.2	7.7	37	10	30	0.7	1968	0.01	0.02	0	13
389.	Peaches .. .. *Amygdalus persica*	88	86.0	1.2	0.3	0.8	1.2	10.5	50	15	41	2.4	0	0.02	0.03	0.5	6
390.	Pears .. .. *Prunus persica*	85	86.0	0.6	0.2	0.3	1.0	11.9	52	8	15	0.5	28	0.06	0.03	0.2	0
391.	Perar .. .. .. *Randia uliginosa*	..	81.7	1.0	0.2	0.7	3.9	12.5	56	33	13	..	..	..	..	..	..
392.	Persimmon .. .. *Diospyros kaki*	93	80.0	0.7	0.2	0.3	0.9	17.9	76	15	10	0.3	2268	0.03	0.01	0	33

Proximate principles, minerals and vitamins —*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene μg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
393.	Phalsa *Grewia asiatica*	69	80.8	1.3	0.9	1.1	1.2	14.7	72	129	39	3.1	419	..	..	0.3	22
394.	Pine apple *Ananas comosus*	60	87.8	0.4	0.1	0.4	0.5	10.8	46	20	9	1.2	18	0.20	0.12	0.1	39
395.	Pipal tree figs *Ficus religiosa*	..	62.4	2.5	1.7	2.3	9.9	21.2	110	289	89	..	..	..	..	..	..
396.	Piyal *Buchanania latifolia*	..	74.3	2.2	0.8	1.7	1.5	19.5	94	78	28	..	..	..	..	..	..
397.	Plum *Prunus domestica*	90	86.9	0.7	0.5	0.4	0.4	11.1	52	10	12	0.6	166	0.04	0.1	0.3	5
398.	Pomegranate *Punica granatum*	68	78.0	1.6	0.1	0.7	5.1	14.5	65	10	70	0.3	0	0.06	0.10	0.3	16
399.	Prunes *Prunus salicina*	..	85.3	0.5	0.3	0.6	0.5	12.8	56	10	18	..	..	..	..	..	..
400.	Pummelo *Citrus maxima*	..	88.0	0.6	0.1	0.5	0.6	10.2	44	30	30	0.3	120	0.03	0.03	0.2	20
401.	Quince *Cydonia oblonga*	..	85.7	0.3	0.1	0.3	1.7	11.9	50	10	20	0.4	..	0.02	0.02	0.2	11
402.	Raisins *Vitis vinifera*	100	20.2	1.8	0.3	2.0	1.1	74.6	308	87	80	7.7	2.4	0.07	0.19	0.7	1
403.	Raspberry	..	84.8	1.0	0.6	0.9	1.0	11.7	56	40	110	2.3	1248	..	..	0.8	30

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
404.	Rayan .. .. *Mimusops hexandra*	..	68.6	0.5	2.4	0.8	..	27.7	134	83	17	0.9	495	0.07	0.08	0.7	16
405.	Rose apple .. .. *Syzygium jambos.*	100	89.1	0.7	0.2	0.3	1.2	8.5	39	10	30	0.5	141	0.01	0.05	0.4	3
406.	Sapota .. .. *Achras sapota*	83	73.7	0.7	1.1	0.5	2.6	21.4	98	28	27	2.0	97	0.02	0.03	0.2	6
407.	Seethaphal .. .. *Annona squamosa*	45	70.5	1.6	0.4	0.9	3.1	23.5	104	17	47	1.5	0	0.07	0.17	1.3	37
408.	Sirka .. .. *Zizyphus rugosa*	..	55.3	3.2	1.3	2.0	4.9	33.3	158	270	94	..	..	..	..	..	..
409.	Star apple .. .. *Eugenia javanica*	..	91.9	0.3	0.2	0.3	1.0	6.3	28	5	10	..	..	..	..	..	..
410.	Strawberry .. .. *Fragaria vesca*	96	87.8	0.7	0.2	0.4	1.1	9.8	44	30	30	1.8	18	0.03	0.02	0.2	52
411.	Thavittu pazham .. *Rhodomyrtus tomentosa*	92	82.5	0.6	0.2	0.4	5.6	10.7	47	40	15	0.9	44	0.07	0.04	0.3	0
412.	Tirkol-ka-phal	..	93.9	0.7	0.1	1.0	..	4.3	21	34	46	..	..	..	..	..	..
413.	Tomato, ripe .. .. *Lycopersicon esculentum*	100	94.0	0.9	0.2	0.5	0.8	3.6	20	48	20	0.4	351	0.12	0.06	0.4	27
414.	Tomatillo .. .. *Physalis ixocarpa*	98	91.7	0.7	0.6	0.6	0.6	5.8	31	7	40	1.4	48	0.05	0.02	2.1	2
415.	Tree tomato .. .. *Cyphomandra betacea*	90	86.2	1.5	0.2	1.2	4.2	6.7	35	12	46	1.0	324	0.11	0.06	2.1	0
416.	Tumki .. .. *Diospyros melanoxylon*	57	70.6	0.8	0.2	0.8	0.8	26.8	112	60	20	0.5	361	0.01	0.04	2.3	1
417.	Vikki pazham .. .. *Elaeocarpus oblongus*	54	59.3	1.4	0.1	1.1	1.6	36.2	153	37	26	3.1	190	0.02	0.06	0.3	0

Proximate principles, minerals and vitamins—*contd.*

S.No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene μg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
418.	Wood apple	53	64.2	7.1	3.7	1.9	5.0	18.1	134	130	110	0.6	61	0.04	0.17	0.8	3
	Limonia acidissima																
419.	Zizyphus	..	81.6	0.8	0.3	0.3	..	17.0	74	4	9	1.8	21	0.02	0.05	0.7	76
	Zizyphus jujuba																
	FISHES AND OTHER SEA FOODS																
420.	Air	..	78.1	15.9	1.3	1.2	..	3.5	89	380	180	0.7	..	..	..	0.5	11
	Mystus seenghala																
421.	Amlet	..	73.5	20.9	1.1	0.9	..	3.7	108	260	220	1.1	..	..	..	..	..
422.	Anchovy	66	69.3	19.3	9.6	1.6	..	0.2	164	143	174	1.5	..	..	..	..	..
	Engraulis mystax																
423.	Bacha	..	68.8	18.1	5.6	1.4	..	6.1	147	520	180	0.7	..	..	..	0.6	13
	Eutropiichthysvacha																
424.	Bali kanakda, dried	..	17.5	44.0	9.0	24.5	..	5.0	277	..	..	..	..	..	..	..	..
425.	Bam	..	74.8	16.1	0.9	1.3	..	6.9	100	330	240	0.8	..	..	..	0.9	3
	Mastocembelus armatus																
426.	Baspata machli	..	76.1	18.2	4.4	1.4	..	0	112	175	225	..	..	..	..	..	..
	Ailia coilia																
427.	Bata, small varieties	..	79.0	14.3	2.5	2.0	..	2.2	89	790	200	1.1	..	..	..	..	..

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
428.	Bele .. .. *Glassogobius giuris*	..	..	79.7	14.5	0.6	2.3	..	2.9	75	370	330	1.0	..	..	..	0.3	3
429.	Bhanger, fresh .. .. *Mugil tade*	..	..	70.6	14.8	8.8	2.0	..	3.8	154	182	190	1.2	..	..	..	1.8	12
430.	Bhanger, dried .. .. *Mugil tade*	..	..	17.9	61.5	2.3	16.5	..	1.8	274	6235	207	9.3	..	..	..	..	..
431.	Bhangan bata . .. *Labeo bata*	..	..	67.3	19.4	4.4	2.2	..	6.7	144	580	310	1.1	..	..	..	0.6	..
432.	Bhetki, fresh .. *Lates calcarifer*	..	50	79.9	14.9	0.8	1.4	..	3.0	79	480	350	3.1	..	..	..	0.7	10
433.	Bhetki, dried .. .. *Lates calcarifer*	..	..	20.1	60.2	2.0	15.9	..	1.8	266	939	347	15.0	..	..	..	..	..
434.	Bhole	..	..	78.1	15.2	1.1	1.9	..	3.7	86	550	580	0.4	..	..	..	0.5	14
435.	Big jawed jumper .. .. *Lactarias lactarias*	..	67	73.3	19.4	5.8	1.4	..	0.1	130	214	306	3.4	..	..	..	..	..
436.	Blue mussel .. .. *Mytilus viridis*	..	43	81.5	9.9	2.0	3.0	..	3.6	72	1134	286	8.0	..	..	..	..	..
437.	Boal .. .. *Wallago attu*	..	..	73.0	15.4	2.7	1.3	..	7.6	116	160	490	0.6	..	..	..	1.0	8
438.	Bombay duck, dried .. *Harpodon neherens*	75	16.7	61.7	4.0	15.1	..	2.5	293	1389	240	19.1	..	..	..	..	..	
439.	Bugda chinghri	..	..	73.0	18.8	1.6	2.1	..	4.5	108	290	420	1.4	..	..	..	..	7
440.	Cat fish .. .. *Arius sona*	..	..	77.1	21.4	..	..	..	..	86	10	230	..	..	..	..	2.5	..
441.	Chela .. .. *Chela phulo*	..	..	77.5	14.6	4.3	2.1	..	1.5	103	590	340	2.0	..	..	..	..	..

Proximate principles, minerals and vitamins--*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture *gm.*	Protein *gm.*	Fat *gm.*	Minerals *gm.*	Fibre *gm.*	Carbo-hydrates *gm.*	Energy *Kcal.*	Calcium *mg.*	Phosphorus *mg.*	Iron *mg.*	Carotene *µg.*	Thiamine *mg.*	Riboflavin *mg.*	Niacin *mg.*	Vitamin C *mg.*
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
442.	Chela, dried *Chela phulo*	..	..	4.7	64.8	17.0	13.4	..	0.1	413	3590	2342	..	..	..	..	..	..
443.	Chiki, dried	..	..	14.6	54.7	6.3	24.2	..	0.2	276	1008	513	89.2	..	..	..	..	..
444.	Chingni (small, dried)	..	..	17.9	62.4	3.9	13.9	..	1.9	292	3539	354	27.9	..	..	..	..	..
445.	Chingri, goda, dried	..	..	14.9	60.0	3.2	17.3	..	4.6	287	3847	828	49.6	..	..	..	..	..
446.	Chital *Notopterus chitala*	..	..	75.0	18.6	2.3	1.0	..	3.1	108	180	250	3.0	..	..	..	..	..
447.	Crab (muscle) *Paratelphusa spinigera*	..	..	83.5	8.9	1.1	3.2	..	3.3	59	1370	150	21.2	780	..	..	3.1	..
448.	Crab (small)	..	..	65.3	11.2	9.8	4.6	..	9.1	169	1606	253	..	..	..	..	..	..
449.	Dhain *Silonia silondia*	..	..	72.0	14.0	12.1	1.4	..	0.5	167	360	240	1.0	..	..	..	0.9	19
450.	Fesha, fresh	..	..	74.0	18.4	1.9	2.5	..	3.2	104	440	340	1.2	..	..	..	..	0
451.	Fesha, dried	..	..	10.3	70.9	4.9	11.9	..	2.0	336	1676	478	18.0	..	..	..	..	..
452.	Fish meal	..	100	8.7	88.4	1.1	2.3	..	0	364	97	381	22.6	0	0.12	0.08	5.3	0

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
453.	Foluì	..	73.0	19.8	1.0	2.5	..	3.7	103	590	450	1.7	..	..	..	0.8	6
	Notopterus notopterus																
454.	Ghol	..	69.7	18.4	0.9	..	..	..	82	90	150	2.1	..	..	..	..	..
	Sciaena miles																
455.	Goggler	60	76.9	18.7	1.6	1.8	..	1.0	93	437	349	8.2	..	..	..	..	..
	Caranx crumenopthalmus																
456.	Golavindalu	..	78.1	20.3	..	1.4	..	..	81	21	150	..	..	..	..	2.3	..
457.	Golim (dried)	100	15.6	66.1	4.6	..	..	..	306	700	702	4.5	..	..	..	..	..
458.	Herring, Indian	50	72.8	20.3	3.2	1.5	..	2.2	119	429	305	9.3	..	..	..	..	..
	Pellona brachysoma																
459.	Herring, ox-eyed	73	73.7	20.7	2.2	1.6	..	0.8	106	429	131	6.3	..	..	..	..	..
	Megalops cyprinoides																
460.	Hilsa	..	53.7	21.8	19.4	2.2	..	2.9	273	180	280	2.1	..	..	..	2.8	24
	Clupea ilisha																
461.	Horse mackerel	58	76.9	21.2	1.6	1.3	..	0	99	357	262	2.0	..	..	..	2.9	..
	Caranx melampygus																
462.	Indian whiting	61	77.1	19.2	0.6	1.5	..	1.6	89	71	262	2.2	..	..	..	..	..
	Sillago sihama																
463.	Jew fish (kora)	75	78.3	18.8	0.8	1.9	..	0.2	83	286	305	4.4	..	..	..	..	..
	Pseudosciaena coibor																
464.	Jew fish (pallikora) ..	49	77.0	20.0	2.2	1.6	..	..	100	214	262	4.8	..	..	..	..	..
	Otolithes ruber																
465.	Joyalimagur, dried	..	13.6	69.7	5.4	8.7	..	2.6	338	1804	893	22.1	..	..	..	..	..
466.	Kalabasu	..	81.0	14.7	1.0	1.3	..	2.0	76	320	380	0.8	..	..	..	0.6	11
	Labeo calbasu																

Proximate principles, minerals and vitamins —*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	b gm.	Carbohydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
467.	Katla *Catla catla*	.. .. ..	73.7	19.5	2.4	1.5	..	2.9	111	530	235	0.9	..	..	..	0.8	
468.	Kholshe	.. .. ..	75.0	16.1	3.9	1.9	..	3.1	112	460	360	0.9	..	..	..	..	..
469.	Khorsula *Mugil corsula*	.. .. ..	75.3	16.3	5.1	1.8	..	1.5	117	410	160	0.6	..	..	..	..	..
470.	Khoyra, fresh *Gonialosa manminna*	.. .. ..	72.0	18.0	3.0	1.8	..	5.2	120	590	220	0.7	..	..	..	0.5	..
471.	Khoyra, dried *Gonialosa manminna*	.. .. ..	17.3	58.9	6.2	16.4	..	1.2	296	..	..	..	..	..	..	..	..
472.	Koi *Anabas testudineus*	.. .. ..	70.0	14.8	8.8	2.0	..	4.4	156	410	390	1.4	..	..	..	0.8	32
473.	Koocha machli *Amphipnous cuchia*	.. .. ..	76.7	18.7	0.8	1.4	..	2.4	92	185	119	..	..	..	..	..	..
474.	Kucha vetki	.. .. ..	72.0	18.9	3.8	1.5	..	3.8	125	460	230	0.8	..	..	..	..	10
475.	Lady vendi	.. .. ..	77.0	18.2	0.7	0.8	..	3.3	92	260	200	0.7	..	..	..	..	..
476.	Lata *Ophiocephalus punctatus*	.. .. ..	74.0	19.4	0.6	2.6	..	3.4	97	610	530	1.3	..	..	..	1.0	0
477.	Laukhola, dried	.. .. ..	33.2	49.8	5.4	6.6	..	5.0	268	515	293	17.8	..	..	..	..	..

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
478.	Lobster *Palaemon sp.*	..	77.3	20.5	0.9	1.4	..	0	90	16	279	..	..	..	..	..	..
479.	Mackerel *Rastrelliger kanagurta*	61	77.3	18.9	1.7	1.6	..	0.5	93	429	305	4.5	..	..	..	..	..
480.	Magur *Clarias batrachus*	..	78.5	15.0	1.0	1.3	..	4.2	86	210	290	0.7	..	..	..	0.5	11
481.	Mahasole *Barbus tor*	..	70.3	25.2	2.3	1.2	..	1.0	126	130	280	3.8	..	..	..	..	..
482.	Mandeli, dried	67	31.1	52.5	5.4	..	..	..	259	145	259	11.9	..	..	..	..	..
483.	Mangalore fish	..	78.1	22.1	1.1	0.5	..	..	98	40	300	1.6	5	0.10	..	2.5	..
484.	Modalmachh (dried)	..	18.1	60.7	4.0	17.1	..	0.1	279	549	448	22.0	..	..	..	..	..
485.	Modki (dried)	78	4.2	72.9	3.2	..	..	..	320	527	597	3.5	..	..	..	..	..
486.	Mowrala *Amblypharyn godonmola*	..	72.0	18.0	4.1	3.3	..	2.6	119	550	350	0.9	..	..	..	0.5	5
487.	Mrigal *Cirrhinus mrigala*	..	75.0	19.5	0.8	1.5	..	3.2	98	350	280	1.1	..	..	..	0.7	..
488.	Mullet *Mugil oeur*	73	69.9	19.1	7.8	1.1	..	2.1	155	357	175	4.4	..	..	..	2.6	..
489.	Mushi, dried	92	9.6	67.0	4.9	..	..	..	312	541	507	2.7	..	..	..	..	..
490.	Mussel, fresh water	..	79.5	14.5	1.6	2.3	..	2.1	81	592	406	..	..	..	..	..	..
491.	Muti, dried	..	19.2	63.6	2.4	11.8	..	3.0	288	7240	834	1.0	..	..	..	..	..
492.	Oil sardine *Sardinella longiceps*	70	76.5	19.6	2.0	1.8	..	0.1	97	357	349	6.1	..	..	..	..	..

Proximate principles, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible % portion	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
493.	Pabda *Callichrous pabo*	..	73.0	19.2	2.1	1.1	..	4.6	114	310	210	1.3	..	..	..	..	..
494.	Pakal	..	76.8	14.3	1.2	1.1	..	6.6	94	130	110	0.4	..	..	..	0.4	0
495.	Palmplate	..	81.0	15.1	1.0	0.7	..	2.2	78	240	140	1.6	..	..	..	..	..
496.	Pangas *Pangasius pangasius*	..	72.3	14.2	10.8	1.0	..	1.7	161	180	130	0.5	..	..	..	0.6	7
497.	Parsey (fresh) *Mugil parsia*	..	70.8	17.5	5.9	1.5	..	4.3	140	850	490	2.7	..	..	..	0.8	6
498.	Parsey (dried) *Mugil parsia*	..	11.8	65.0	4.4	15.8	..	3.0	312	2231	396	17.4	..	..	..	..	..
499.	Patamachh (dried)	..	12.6	64.5	2.7	17.6	..	2.5	293	988	430	51.7	..	..	..	..	..
500.	Pollana	..	75.7	21.8	..	1.4	..	..	87	43	276	0.6	..	..	..	3.6	..
501.	Pomfrets, black *Formio niger*	..	74.5	20.3	2.6	1.1	..	1.5	111	286	306	2.3	..	..	..	..	..
502.	Pomfrets, white *Stromateus sinensis*	..	78.4	17.0	1.3	1.5	..	1.8	87	200	290	0.9	..	..	0.15	2.6	..
503.	Prawn *Penaeus sp.*	..	77.4	19.1	1.0	1.7	..	0.8	89	323	278	5.3	0	0.01	0.10	4.8	..

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
504.	Puti *Barbus sp.*	..	75.0	18.1	2.4	1.4	..	3.1	106	110	96	1.0	..	..	..	0.3	15
505.	Rangoli	..	66.6	16.9	1.2	..	..	..	78	73	113	1.9	..	..	..	..	..
506.	Ravas *Polynemus tetradactylus*	77	71.4	22.2	1.1	2.0	..	3.3	112	405	335	2.0	..	..	..	..	..
507.	Ray *Rhinoptera sewelli*	50	75.3	20.9	0.5	1.2	..	2.1	97	214	262	5.3	..	..	..	..	..
508.	Ribbon fish (fresh) *Trichiurus sp.* ..	82	76.6	18.1	3.2	1.5	..	0.6	104	214	218	13.9	..	..	..	2.1	..
509.	Ribbon fish (dried) *Trichiurus sp.* ..	100	6.7	76.1	8.7	..	..	..	383	739	700	4.2	..	..	..	..	..
510.	Rohu *Labeo rohita*	78	76.7	16.6	1.4	0.9	..	4.4	97	650	175	1.0	..	0.05	0.07	0.7	22
511.	Royna	..	76.0	15.6	1.1	1.2	..	6.1	97	120	80	0.4	..	..	..	0.6	8
512.	Rupapatar (dried)	..	14.2	54.6	14.3	15.5	..	1.4	353	890	413	43.7	..	..	..	..	..
513.	Sakchi *Dasyatis sp.*	..	80.6	16.7	0.5	1.0	..	1.2	76	5	155	..	..	..	..	..	..
514.	Sardine *Sardinella fimbriata*	60	78.1	21.0	1.9	1.7	..	..	101	90	360	2.5	..	..	..	2.6	..
515.	Sarputi *Barbus sarana*	..	70.2	16.5	9.5	1.5	..	2.3	161	220	120	0.5	..	..	..	..	14
516.	Shanka chur (dried)	..	16.4	67.2	6.1	9.0	..	1.3	329	780	501	11.9	..	..	..	..	..
517.	Shark *Carcharias sp.*	67	76.0	21.6	0.4	1.2	..	0.8	93	357	262	1.4	..	..	..	2.5	..
518.	Shengti	94	47.2	37.1	3.8	..	..	..	183	208	412	4.2	..	..	..	..	..

COMMUNITY HEALTH CELL

Proximate principles, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
519.	Shrimp (small, dried)	.. ..	6.0	68.1	8.5	17.4	..	..	349	4384	1160	..	..	..	..	..	..
520.	Seer .. *Cybium guttatum*	.. ..	66	72.7	22.5	4.0	1.5	..	..	126	71	572	5.4	..	..	..	1.2	..
521.	Silver belly .. *Leiognathus insidiator*	.. ..	94	76.4	19.2	1.6	3.2	..	0	91	715	741	2.2	..	..	..	..	..
522.	Singhala .. *Arius dussumieri*	.. ..	58	61.0	20.9	3.1	1.1	..	13.9	167	98	152	1.8	..	..	..	..	..
523.	Singhi .. *Saccobranchus fossilis*	.. ..	..	68.0	22.8	0.6	1.7	..	6.9	124	670	650	2.3	..	..	..	0.8	9
524.	Sode (dried) ..	.. ..	100	24.4	66.1	2.5	..	..	..	287	278	608	8.1	..	..	..	..	..
525.	Sole .. *Ophiocephalus striatus*	.. ..	..	78.0	16.2	2.3	1.3	..	2.2	94	140	95	0.5	..	..	..	0.5	9
526.	Sole (Malabar) .. *Cynoglossus semifasciatus*	.. ..	100	78.0	19.5	4.7	3.1	..	..	120	1072	524	10.1	..	..	..	..	..
527.	Surmai (fresh) .. *Cybium commersonii*	.. ..	..	63.0	19.9	1.4	..	..	..	92	92	161	2.0	..	..	..	..	..
528.	Surmai (dried) .. *Cybium commersonii*	.. ..	91	43.3	38.6	6.2	..	..	..	210	148	172	4.4	..	..	..	..	..
529.	Taltapra (dried) ..	.. ..	..	11.0	54.5	16.3	16.8	..	1.4	370	907	413	88.7	..	..	..	..	..

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
530.	Tapra (dried)	..	12.6	62.3	9.0	15.1	..	1.0	334	771	552	19.3	..	..	..	..	..
531.	Tapsi (dried) .. .. *Polynemus paradiseus*	..	16.2	58.5	12.1	17.2	..	..	343	1597	595	41.2	..	..	..	..	..
532.	Tartoor .. .. *Opisthopterus tardoore*	49	78.3	18.2	0.2	2.1	..	1.2	79	1072	218	4.9	..	..	..	..	..
533.	Tendli (fresh)	100	72.6	19.6	3.1	1.9	..	2.8	118	82	158	1.3	..	..	..	.	..
534.	Tendli (dried)	100	17.8	60.8	4.4	..	..	..	283	315	644	5.3	..	..	..	..	..
535.	Tengra (fresh) .. .. *Mystus vittatus*	..	70.0	19.2	6.4	2.1	..	2.3	144	270	170	2.0	..	..	..	..	18
536.	Tengra (dried) .. .. *Mystus vittatus*	..	13.8	54.9	3.9	27.5	..	..	255	843	400	..	..	..	..	..	.
537.	Tunny .. .. *Thynnus macropterus*	61	71.9	23.8	1.6	1.8	..	0.9	113	429	349	6.8	..	..	..	..	..
538.	Vajra	..	79.4	19.9	1.5	1.4	..	..	93	40	380	0.7	5.4	0.10	..	2.5	..
539.	White bait .. .. *Anchoviella sp.*	100	79.1	14.5	1.4	2.5	..	2.5	81	643	437	3.8	..	..	..	2.3	..
	OTHER FLESH FOODS																
540.	Beef meal .. .. *Bos taurus*	100	8.2	79.2	10.3	1.6	0.5	0.2	410	68	324	18.8	0	0.03	0.44	5.8	0
541.	Beef muscle .. .. *Bos taurus*	..	74.3	22.6	2.6	1.0	..	..	114	10	190	0.8	0*	0.15	0.04	6.4	2
542.	Boordood	..	2.1	49.3	44.5	4.1	..	..	598	48	457	..	..	..	..	..	..

* Contains also 18 μg of vitamin A

Proximate principles, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
543.	Buffalo meat *Balbus bubalis*	.. .. ..	78.7	19.4	0.9	1.0	..	..	86	3	189	..	..	..	..	..	..
544.	Dhauns *Rana tigrina*	.. .. ..	79.1	19.6	0.4	1.0	..	..	82	10	176	..	..	..	..	..	..
545.	Duck *Anas platyrayncha*	.. .. ..	72.3	21.6	4.8	1.2	..	0.1	130	4	235	..	..	..	..	..	..
546.	Egg, duck	.. .. ..	71.0	13.5	13.7	1.0	..	0.8	181	70	260	3.0	540*	0.12	0.26	0.2	..
547.	Egg, hen	.. .. ..	73.7	13.3	13.3	1.0	..	..	173	60	220	2.1	600*	0.10	0.40	0.1	0
548.	Egg, turtle	.. .. ..	76.0	12.2	6.7	1.5	..	3.6	124	93	299	..	..	..	..	..	..
549.	Field rat's meat	.. .. ..	73.9	23.6	1.0	1.4	..	0.1	104	30	242	..	..	..	..	..	..
550.	Finch *Fringillidoe*	.. .. ..	68.8	26.6	3.0	1.7	..	..	133	90	347	..	..	..	..	..	..
551.	Fowl *Gallus bankiva murghi*	.. .. ..	72.2	25.9	0.6	1.3	..	..	109	25	245	..	..	..	0.14	..	..
552.	Goat meat *Capra hyrchusb*	.. .. ..	74.2	21.4	3.6	1.1	..	..	118	12	193	..	..	..	..	..	..
553.	Grey quail *Coturnic coturni x*	.. .. ..	75.0	21.9	1.7	1.4	..	..	103	22	282	..	..	..	..	..	..

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
554.	Liver goat .. .. .. *Capra hyrchusb*		76.3	20.0	3.0	1.3	..	..	107	17	279	..	..	..	..	..	..
555.	Liver, sheep		70.4	19.3	7.5	1.5	..	1.3	150	10	380	6.3	0**	0.36	1.70	17.6	20
556.	Mutton, muscle		71.5	18.5	13.3	1.3	..	..	194	150	150	2.5	0***	0.18	0.14	6.8	..
557.	Meat of narrow snouted crocodile *Gavialis gangeticus Gmelin*	..	77.4	20.6	0.4	1.3	..	0.3	87	13	162	..	..	..	..	..	..
558.	Pigeon .. .. .. *Columba livia intermedia*		70.4	23.3	4.9	1.4	..	..	137	12	290	..	..	..	..	..	..
559.	Pork, muscle .. .. .. *Sus cristatus Wagner*		77.4	18.7	4.4	1.0	..	..	114	30	200	2.2	0	0.54	0.09	2.8	2
560.	Red ants with eggs .. .. *Aecophylla smaragdina Fab*		71.6	13.4	4.6	1.3	..	9.1	131	104	107	..	..	..	..	..	..
561.	Ruff and reeve .. .. .. *Philomachus pugnax, Linn*		70.3	25.9	2.3	1.5	..	..	124	3	321	..	..	..	..	..	..
562.	Snail, small .. .. .. *Viviparus bengalensis typica (Lamarck)*		78.9	12.6	1.0	3.8	..	3.7	74	1321	147	..	..	..	..	..	..
563.	Snail, big .. .. .. *Pila globosa*		74.1	10.5	0.6	2.4	..	12.4	97	870	116	..	..	..	..	..	..
564.	Turtle's meat .. .. .. *Lissemys punctata Bonnaterre*		79.4	16.5	1.5	1.1	..	1.5	86	7	162	..	..	..	..	..	..

* Contains also 360 μg. of vitamin A. ** Contains also 6690 μg of vitamin A. *** Contains also 9 μg.. of vitamin A.

Proximate principles, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Vitamin A I.U.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
565.	Venison *Antilope cervicapra Linn*	.. ..	..	75.3	21.0	0.6	1.2	..	1.9	97	3	233	..	..	..	..	..	..
566.	Wood sand piper *Tringa galareola*	.. ..	..	72.1	22.9	2.1	1.4	..	1.5	117	8	300	..	..	..	..	..	..
	MILK AND MILK PRODUCTS																	
567.	Milk, buffalo's	.. ..	100	81.0	4.3	8.8	0.8	..	5.0	117	210	130	0.2	160	0.04	0.10	0.1	1
568.	Milk, cow's	.. ..	100	87.5	3.2	4.1	0.8	..	4.4	67	120	90	0.2	174*	0.05	0.19	0.1	2
569.	Milk, goat's	.. ..	100	86.8	3.3	4.5	0.8	..	4.6	72	170	120	0.3	182	0.05	0.04	0.3	1
570.	Milk, human	.. ..	100	88.0	1.1	3.4	0.1	..	7.4	65	28	11	..	137	0.02	0.02	..	3
571.	Milk, ass's	.. ..	100	89.9	2.1	1.5	..	..	6.5	48	80	..	..	..	0.06	0.03	0.1	10
572.	Curds (Cow's Milk)	.. ..	100	89.1	3.1	4.0	0.8	..	3.0	60	149	93	0.2	102	0.05	0.16	0.1	1
573.	Butter milk	.. ..	100	97.5	0.8	1.1	0.1	..	0.5	15	30	30	0.1	0	..	..	..	..

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
574.	Skimmed milk, liquid ..	100	92.1	2.5	0.1	0.7	..	4.6	29	120	90	0.2	..	..	..	0.1	1
575.	Channa, cow's milk ..	100	57.1	18.3	20.8	2.6	..	1.2	265	208	138	..	366	0.07	0.02	..	3
576.	Channa, buffalo milk ..	100	54.1	13.4	23.0	1.6	..	7.9	292	480	277	..	..	..	..	..	..
577.	Cheese	100	40.3	24.1	25.1	4.2	..	6.3	348	790	520	2.1	273	..	..	..	..
578.	Kheer	100	69.0	6.9	12.2	2.3	..	9.6	176	388	237	..	242	0.12	0.35	0.3	3
579.	Khoa (whole buffalo milk) ..	100	30.6	14.6	31.2	3.1	..	20.5	421	650	420	5.8	..	..	..	..	..
580.	Khoa (skimmed buffalo milk)	100	46.1	22.3	1.6	4.3	..	25.7	206	990	650	2.7	..	..	..	..	..
581.	Khoa (whole cow milk) ..	100	25.2	20.0	25.9	4.0	..	24.9	413	956	613	..	497	0.23	0.41	0.4	6
582.	Skimmed milk powder ((cow's milk) ..	100	4.1	38.0	0.1	6.8	..	51.0	357	1370	1000	1.4	0	0.45	1.64	1.0	5
583.	Whole milk powder (cow's milk) ..	100	3.5	25.8	26.7	6.0	..	38.0	496	950	730	0.6	1400	0.31	1.36	0.8	4
	FATS AND EDIBLE OILS																
584.	Butter	100	19.0	..	81.0	2.5	..	..	729	..	..	..	3200	..	..	..	..
585.	Ghee (cow)	100	..	..	100.0	..	..	..	900	..	..	..	2000	..	..	..	..
586.	Ghee (buffalo)	100	..	..	100.0	..	..	..	900	..	..	..	900	..	..	..	..

* Cow's milk contains, in addition, 6.0 μg. Cartone.

Proximate principles, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
587.	Hydrogenated oil .. (fortified)	.. 100	..	..	100.0	..	..	..	900	..	..	..	2500*	..	..	..	..
588.	Cooking oil .. (Groundnut, Gingelly, Mustard, Coconut, etc.)	.. 100	..	..	100.0	..	..	..	900	..	..	..	0*	..	..	..	..
	MISCELLANEOUS FOODSTUFFS																
589.	Adda seed (kernel) *Bauhinia vahlii*	.. ..	9.5	27.3	29.9	3.6	1.1	28.6	493	302	718	6.8	..	0.17	0.17	1.1	..
590.	Amaranth seeds .. *Amaranthus sp.*	.. 100	10.0	14.7	1.9	3.1	9.6	60.7	319	510	397	11.0	..	0.07	0.21	0.5	1
591.	Arecanut .. *Areca catechu*	.. ..	31.3	4.9	4.4	1.0	11.2	47.2	249	50	130	1.5	3.0	..	..	..	..
592.	Arrow root flour .. *Maranta arundinacea*	.. ..	16.5	0.2	0.1	0.1	..	83.1	334	10	20	1.0	..	..	..	..	..
593.	Avocado pear (nut) *Persea americana*	.. ..	63.7	2.5	0.7	1.1	..	32.0	144	20	80	1.2	..	..	..	..	..
594.	Bajjar bhang ..	.. ..	6.6	17.2	8.5	3.9	2.2	61.6	392	83	424	20.0	280	1.10	0.56	2.5	0
595.	Barai dal ..	.. ..	6.5	21.6	0.9	3.5	4.3	63.2	347	109	458	..	..	..	..	..	..
596.	Betel leaves .. *Piper betle*	.. ..	85.4	3.1	0.8	2.3	2.3	6.1	44	230	40	7.0	5760	0.07	0.03	0.7	5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
597.	Bhangari	76	10.5	11.3	3.1	2.3	0.8	72.0	361	44	369	17.0	85	0.93	0.34	4.2	0
598.	Bhangari-ka–atta.. ..	100	13.4	9.3	3.2	2.9	10.4	60.8	309	61	338	30.5	47	0.44	0.12	0.9	0
599.	Bhilisa of elo	100	6.5	9.6	2.3	4.4	5.6	71.6	346	90	356	14.0	28	1.12	0.30	6.8	0
600.	Bhoose-ka-atta	100	13.1	8.2	1.3	6.0	9.0	62.4	294	109	325	30.2	24	0.39	0.07	1.0	0
601.	Bhorra chhatto	..	94.4	1.9	0.9	0.8	..	2.0	24	4	103	..	..	..	..	..	..
602.	Bid root	...	47.7	2.1	0.3	1.1	0.9	47.9	203	11	133	..	..	..	..	..	..
603.	Biscuits, salt	100	4.5	6.6	32.4	1.9	..	54.6	534	..	..	..	..	..	..	..	..
604.	Biscuits, sweet	100	5.4	6.4	15.2	1.1	..	71.9	450	..	..	..	..	..	..	..	..
605.	Bread, brown	100	39.0	8.8	1.4	..	1.2	49.0	244	18	..	2.2	..	0.21	..	2.5	..
606.	Bread, white	100	39.0	7.8	0.7	..	0.2	51.9	245	11	..	1.1	..	0.07	..	0.7	..
607.	Cane sugar .. .. *Saccharum officinarum*	100	0.4	0.1	0	0.1	0	99.4	398	12	1	..	..	..	..	..	..
608.	Cholai or Seel	..	11.5	13.6	5.5	3.1	5.6	60.7	347	160	550	4.5	..	..	..	3.7	..
609.	Chookri-ka-atta ..	100	14.2	8.1	1.8	5.0	6.0	64.9	308	1047	173	39.7	67	0.15	0.04	2.5	0
610.	Chookri-ka-patta ..	100	13.1	2.9	1.8	9.3	14.3	58.6	262	2871	41	41.3	127	0.21	0.03	2.7	5

* These values represent I. U. vitamin A.

Proximate principles, minerals and vitamins—*contd.*

S.No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
611.	Chota karhani chatto ..	..	88.0	6.3	0.9	1.8	..	3.0	45	7	155	..	..	..	..	..	..
612.	Chukary ..	..	6.6	2.2	0.5	12.4	14.7	63.6	268	4626	15	14.7	286	0.01	0	0.3	0
613.	Coconut, tender *Cocos nucifera*	.. ..	90.8	0.9	1.4	0.6	..	6.3	41	10	30	0.9	..	..	..	..	2
614.	Coconut milk .. *Cocos nucifera*	.. 100	42.8	3.4	41.0	0.9	0	11.9	430	15	140	1.6	0	0.08	0.04	0.6	3
615.	Coconut water .. *Cocos nucifera*	.. 100	93.8	1.4	0.1	0.3	0	4.4	24	24	10	0.1	0	0.01	0	0.1	2
616.	Coconut meal, deoiled *Cocos nucifera*	.. 100	8.7	23.8	2.8	7.0	9.8	47.9	312	112	646	69.4	0	0.13	0.57	6.0	5
617.	Cowage seed flour..	.. ..	5.3	28.2	7.0	1.7	2.2	55.6	398	188	211	.	..	..	.	..	..
618.	Daincha seeds .. *Mucuna capitata*	.. 100	10.8	28.1	3.8	3.6	8.6	45.1	327	240	390	16.5	..	0.33	0.31	2.5	2
619.	Dingil chatto .. *Collybica sp.*	.. ..	85.5	6.4	1.0	3.1	..	4.0	51	3	186	..	..	..	..	..	..
620.	Elo ..	.. 100	10.6	12.2	2.0	3.2	1.8	71.2	352	43	358	9.0	15	1.35	0.40	11.4	0
621.	Fish liver oil ..	.. 100	..	..	100	..	..	..	900	..	..	..	*	..	..	..	..
622.	Groundnut cake .. *Arachis hypogaea*	.. ..	7.2	40.9	7.4	2.5	3.2	38.8	386	213	548	..	..	..	..	..	..

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
623.	Honey		20.6	0.3	0	0.2	..	79.5	319	5	16	0.9	0	0	0.04	0.2	4
624.	Jack fruit seeds .. *Artocarpus heterophyllus*		64.5	6.6	0.4	1.2	1.5	25.8	133	50	97	1.5	10	0.25	0.11	0.3	11
625.	Jaggery (cane)		3.9	0.4	0.1	0.6	..	95	383	80	40	11.4	168	0.02	0.04	0.5	0
626.	Jaggery (coconut palm)		10.3	1.0	0.2	5.0	..	83.5	340	1638	62	..	..	..	..	..	..
627.	Jaggery (date palm)		9.6	1.5	0.3	2.6	..	86.1	353	363	62	..	..	...	..	..	..
628.	Jaggery (fan palm)		8.6	1.0	0.1	1.8	..	98.5	359	225	44	..	..	..	..	..	..
629.	Jaggery (sago palm)		9.2	2.3	0.1	3.7	..	84.7	349	1252	372	..	..	..	..	..	..
630.	Kalipakku		13.8	6.4	8.4	1.8	11.8	57.8	332	130	140	11.1	..	..	..	..	..
631.	Kittul flour .. .. .. *Caryota urens*		13.1	2.4	0.3	2.5	..	81.7	339	130	60	20.0	..	..	..	..	..
632.	Lamtra	100	10.7	12.2	1.9	2.0	1.8	71.4	352	47	358	4.0	63	0.98	0.12	9.8	0
633.	Lotus seed, dry .. .. .. *Nelumbium nelumbo*		10.0	17.2	2.4	3.8	2.6	64.0	346	36	294	2.3	..	..	..	.	..
634.	Lotus seed, green and mature .. *Nelumbium nelumbo*	..	84.6	3.9	0.7	1.1	0.9	8.8	57	49	151	..	..	..	..	.	..
635.	Madapu ginja		36.0	20.2	18.8	2.6	..	22.4	340	210	440	4.5	..	..	..	..	..

* Fish liver oils contain preformed vitamin A, the contents per 100 gms. being 20,000 to 70,000 μg in cod liver oil, about 70,000 μg in shark liver oil and 1,000,000 μg in halibut liver oil.

Proximate principles, minerals and vitamins—*contd.*

S. No.	Name of foodstuff	Edible % portion	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
636.	Mahua flowers .. *Bassia latifolia*	89	18.6	4.4	0.6	2.7	1.7	72.0	311	140	140	15.0	23	0.03	0.88	5.2	7
637.	Makhana .. *Euryale ferox*	..	12.8	9.7	0.1	0.5	..	76.9	347	20	90	1.4	..	..	..	..	..
638.	Malted palmyra root	..	11.2	5.2	0.5	2.9	..	80.2	346	20	160	4.2	..	..	..	..	..
639.	Mango seed kernel	.. 54	55.0	2.6	4.2	1.4	0.9	35.9	192	40	110	0.7	20	0.21	0.19	0	9
640.	Mango powder ..	..	6.8	2.8	7.8	4.9	13.7	64.0	337	180	160	45.2	0	..	..	0.7	41
641.	Marking nut (kernel)	..	3.8	26.4	36.4	3.6	1.4	28.4	587	295	836	6.1	..	0.38	0.15	2.7	..
642.	*Semecarpus anacardium* Mushroom ..	.. 88	88.5	3.1	0.8	1.4	0.4	4.3	43	6	110	1.5	0	0.14	0.16	2.4	12
643.	*Entoluma macrocarpom* Neera ..	.. ..	..	0.4	..	0.5	..	10.9	45	0	140	0.1	..	0.02	0	0	13
644.	Pachwai (Assam) ..	.. 100	88.2	3.0	1.8	0.6	0.6	5.8	51	12	100	4.5	..	0.07	0.06	3.0	0
645.	Pappad ..	.. 100	20.3	18.8	0.3	8.2	..	52.4	288	80	300	17.2	0	..	..	..	0
646.	Perandai .. *Vitis quadrangularis*	.. ..	87.4	1.2	0.3	2.0	1.8	7.3	37	650	50	2.1	..	..	..	..	..

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
647.	Phutka chhattoo (Rugroo)	..	80.9	3.7	0.4	0.9	..	14.1	75	16	73	..	186	0.01	0.08	0	2
	Lycoperdon sp.																
648.	Poppy seeds	..	4.3	21.7	19.3	9.9	8.0	36.8	408	1584	432	..	..	..	..	..	..
	Papaver somniferum																
649.	Pumpkin seeds	70	8.0	24.3	47.2	4.7	0.2	15.6	584	50	830	5.5	38	0.33	0.16	3.1	1
	Cucurbita maxima																
650.	Rajkeera seeds	100	9.3	16.5	5.3	3.5	2.7	62.7	364	223	655	17.6	..	0.17	0.20	3.6	0
	Amaranthus paniculatus																
651.	Red palm oil	100	..	..	100	..	..	..	900	..	..	..	..	..	..	..	..
	Elaeis guineensis																
652.	Roselle seeds	..	6.5	20.9	21.3	4.9	15.5	30.9	399	300	600	..	..	..	..	..	..
653.	Sal ka phal	..	10.0	8.4	11.8	1.0	2.5	66.3	405	102	149	..	..	..	..	..	..
	Shorea robusta																
654.	Sago	..	12.2	0.2	0.2	0.3	..	87.1	351	10	10	1.3	..	0.01	..	0.2	..
655.	Sea weeds, fresh	100	91.0	0.8	0.2	4.0	0.3	3.7	20	134	10	7.0	560	0.05	..	1.7	3
656.	Sea weeds, dry	100	9.5	10.8	0.8	22.7	5.0	51.2	255	1543	114	..	94	0.04	..	0	1
657.	Sugar cane juice	..	90.2	0.1	0.2	0.4	..	9.1	39	10	10	1.1	6	..	0.04	..	..
658.	Tamarind seed kernel, roasted	..	9.9	16.1	7.3	1.6	1.0	64.1	387	121	237	..	..	..	..	..	..
	Tamarindus indica																
659.	Toddy, fermented	..	97.6	0.1	0.3	0.2	..	1.8	38	..	..	..	0	0.01	0.01	0.2	..
660.	Toddy, sweet	..	84.7	0.1	0.3	0.7	..	14.3	59	150	10	0.3	..	..	0.04	..	..

Proximate principles, minerals and vitamins—*concld.*

S. No.	Name of foodstuff	Edible portion %	Moisture gm.	Protein gm.	Fat gm.	Minerals gm.	Fibre gm.	Carbo-hydrates gm.	Energy Kcal.	Calcium mg.	Phosphorus mg.	Iron mg.	Carotene µg.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
661.	Water lily seeds .. *Nymphaea nouchali*	.. ..	10.0	8.3	1.0	0.9	4.2	75.6	345	20	110	..	..	..	..	..	..
662.	Water melon seeds (kernel) *Citrullus vulgaris*	.. ..	4.3	34.1	52.6	3.7	0.8	4.5	628	100	937	7.4	..	0.13	0.20	1.3	..
663.	Yeast, dried (Brewer's)	.. ..	13.6	39.5	0.6	7.0	0.2	39.1	320	440	1490	43.7	66	6.0	4.0	40.0	0
664.	Yeast, dried (food)	.. ..	7.8	35.7	1.8	8.4	..	46.3	344	160	2090	21.5	..	3.20	..	27.0	0

TABLE 2

TRACE ELEMENTS AND ACID-BASE BALANCE

(All the values given are per 100 gms. of the edible portion)

Sl. No.	Name of foodstuff	Magnesium	Sodium	Potassium	Copper	Sulphur	Chlorine	Acid-base balance (ml. 0.1 N)	
		mg.	*mg.*	*mg.*	*mg.*	*mg.*	*mg.*	*Acid*	*Base*
	CEREAL GRAINS AND PRODUCTS								
1.	Bajra	125	10.9	307	0.55	147	39	87	..
4.	Barley - ..	127	16.1	253	0.34	130	91	57	..
5.	Buck wheat ..	227	16.2	362	0.71	148	6	5	..
6.	Italian millet ..	120	4.6	250	0.55	171	37	124	..
8.	Jowar	140	7.3	131	1.78	54	44	25	..
9.	Maize, dry ..	144	15.9	286	0.19	114	33	102	..
10.	Maize, tender ..	40	51.7	151	..	61	34	27	..
12.	Panivaragu ..	73	8.2	113	0.28	157	19	137	..
13.	Ragi	191	11.0	408	0.59	160	44	..	143
15.	Rice, parboiled, milled	38	10.0	117	0.33	79	13	75	..
17.	Rice, raw, milled ..	48	8.0	70	0.72	53	7	72	..
19.	Rice flakes ..	101	10.9	154	0.37	105	17	71	..
21.	Samai	60	8.1	129	0.42	149	13	124	..
23.	Semolina	..	21.0	83	..	..	..	..	..
24.	Varagu	112	4.6	144	0.87	136	11	44	..
25.	Vermicelli ..	42	7.9	138	0.29	145	46	79	..
26.	Wheat, Bulgar ..	144	4.5	260	0.56	143	22	82	..
27.	Wheat, whole ..	138	17.1	284	0.49	128	47	77	..

Trace elements and acid-base balance—*Contd.*

Sl. No.	Name of foodstuff	Magnesium	Sodium	Potassium	Copper	Sulphur	Chlorine	Acid-base balance ml. 0.1 N	
		mg.	*mg.*	*mg.*	*mg.*	*mg.*	*mg.*	*Acid*	*Base*
28.	Wheat flour ..	55	20.0	315	0.49	122	29	76	..
29.	Wheat flour-(refined)	42	9.3	130	0.19	115	47	80	..
	PULSES AND LEGUMES								
31.	Bengal gram (whole)..	168	37.3	808	0.76	179	58	..	132
32.	Bengal gram dhal ..	138	73.2	720	0.98	160	39	..	33
34.	Black gram dhal ..	185	39.8	800	0.72	174	9	..	91
35.	Cow pea ..	230	23.2	1,131	0.75	165	10	..	154
37.	Green gram (whole) ..	171	28.0	843	0.97	188	12	..	99
38.	Green gram dhal ..	189	27.2	1,150	1.13	214	25	..	96
39.	Horse gram ..	172	11.5	762	1.03	181	8	..	169
40.	Khesari dhal ..	92	37.7	644	0.77	144	36	3	..
41.	Lentil ..	94	40.1	629	0.66	104	19	18	..
42.	Moth beans ..	225	29.5	1,096	0.85	180	9	..	316
43.	Peas, dry.. ..	124	20.4	725	0.85	189	59	..	7
44.	Peas, roasted ..	122	14.7	750	1.32	200	73	29	..
46.	Red gram dhal ..	133	28.5	1,104	1.25	177	5	..	132
	LEAFY VEGETABLES								
51.	Amaranth, tender ..	247	230.0	341	0.33	61	88	..	472
54.	Bamboo, tender shoots	32	91.0	..	0.19	..	76	..	..
60.	Brussels sprouts ..	26	7.9	477	0.07	212	22	23	..
61.	Cabbage ..	10	14.1	114	0.08	67	12	11	..
64.	Celery leaves ..	52	35.5	210	0.30	102	19	..	67

Trace elements and acid-base balance—*Contd.*

Sl. No.	Name of foodstuff	Magnesium	Sodium	Potassium	Copper	Sulphur	Chlorine	Acid-base balance (ml. 0.1 N)	
		mg.	*mg.*	*mg.*	*mg.*	*mg.*	*mg.*	*Acid*	*Base*
74.	Coriander leaves ..	64	58.3	256	0.53	49	43	..	147
76.	Curry leaves ..	221	..	..	0.21	81	198	..	..
77.	Drumstick leaves ..	24	..	259	0.62	137	423	..	..
78.	Fenugreek leaves ..	67	76.1	31	0.26	167	165	..	110
84.	Gogu	35	..	..	..	60	19	..	..
101.	Lettuce	30	58.0	33	0.08	27	23	..	41
110.	Mint	..	..	..	..	84	34	..	..
116.	Neem, tender ..	127	72.2	254	0.60	96	26	..	75
121.	Paruppu keerai ..	120	67.2	716	0.19	63	73	..	277
134.	Safflower leaves ..	51	126.4	181	0.22	..	235	..	..
143.	Sonchal sag	..	..	680	0.39	..	..	..	..
144.	Spinach	84	58.5	206	0.01	30	54	..	134
149.	Tamarind leaves, tender.	71	..	..	2.09	63	94	..	..
	ROOTS AND TUBERS								
163.	Beet root ..	9	59.8	43	0.20	14	24	..	93
167.	Carrot	14	35.6	108	0.13	27	13	268	..
170.	Colocasia		9.0	550	..	..	..	..	..
173.	Gotigadde ..	135	25.2	326	0.22	173	93	..	68
183.	Onion, small		4.0	127	..	..	..	..	..
185.	Potato	20	11.0	247	0.20	37	16	..	36
186.	Radish, pink ..	9	63.5	10	0.19	31	11	..	27
189.	Radish, white		33.0	138	..	..	..	..	..

Trace elements and acid-base balance--*Contd.*

Sl.No.	Name of foodstuff	Magnesium	Sodium	Potassium	Copper	Sulphur	Chlorine	Acid-base balance	
								ml. 0.1 N	
		mg.	*mg.*	*mg.*	*mg.*	*mg.*	*mg.*	*Acid*	*Base*
191.	Sweet potato	..	9.0	393	..	..	..	..	..
193.	Tapioca chips, dried	66	7.5	764	0.15	58	10	..	214
198.	Yam (ordinary)	..	9.0	237	..	..	..	..	..
199.	Yam (wild) ..	34	11.0	450	0.16	35	29	..	80
	OTHER VEGETABLES								
208.	Bitter gourd ..	17	17.8	152	0.18	15	8	..	14
209.	Bitter gourd (small variety) ..	21	2.4	171	0.19	21	8	19	..
211.	Bottle gourd ..	5	1.8	87	0.03	10	5	..	23
212.	Brinjal	16	3.0	200	0.17	44	52	..	14
213.	Broad beans ..	33	43.5	39	0.17	53	43	5	..
214.	Cauliflower ..	20	53.0	138	0.05	231	34	99	..
221.	Cucumber ...	11	10.2	50	0.10	17	15	0	0
223.	Drumstick ..	24	..	259	0.60	137	423	..	..
225.	Field beans, tender ..	34	55.4	74	0.13	40	31	..	98
227.	French beans ..	29	4.3	120	0.21	37	10	..	38
231.	Jack tender	..	35.0	328	..	..	..	..	..
238.	Knol-khol ..	18	112.0	37	0.09	143	67	48	..
239.	Ladies fingers ..	43	6.9	103	0.19	30	41	..	31
242.	Lotus stem, dry ..	168	438.0	3,007	1.22	258	444	..	931
243.	Mango, green ..	21	43.0	83	0.24	15	2	..	40
247.	Onion stalks ..	15	2.2	109	0.14	33	7	..	11
248.	Papaya, green	..	23.0	216	..	..	..	..	..

Trace elements and acid-base balance—*Contd.*

Sl.No.	Name of foodstuff	Magnesium	Sodium	Potassium	Copper	Sulphur	Chlorine	Acid-base balance (ml. 0.1 N)	
		mg.	*mg.*	*mg.*	*mg.*	*mg.*	*mg.*	*Acid*	*Base*
249.	Parwar ..	9	2.6	83	1.11	17	4	..	7
250.	Peas ..	34	7.8	79	0.23	95	20	93	..
251.	Pink beans	..	32.2	117	0.13	182	47	..	..
252.	Plantain flower	54	20.1	185	0.10	68	68	..	28
253.	Plantain, green	33	15.0	193	0.16	15	6	..	59
255.	Pumpkin	14	5.6	139	0.20	16	4	..	24
258.	Red gram, tender	58	93.0	463	0.40	494	22	185	..
260.	Ridge gourd	11	2.9	50	0.16	14	7	..	7
264.	Snake gourd	53	25.4	34	0.11	35	21	..	48
267.	Sword beans	..	29.0	1,800	..	..	..	..	..
269.	Tinda, tender	14	35.0	24	0.12	..	44	..	..
270.	Tomato, green	15	45.8	114	0.19	24	38	..	22
271.	Vegetable marrow	13	27.3	94	0.22	11	9	..	23
	NUTS AND OIL SEEDS								
280.	Garden cress seeds	430	..	..	..	1	41	..	..
284.	Jungli badam	274	..	517	0.82	122	12	..	..
290.	Piyal seeds	373	10.2	436	0.86	186	25	..	98
	CONDIMENTS, SPICES, ETC								
297.	Chillies (dry)	..	14.0	530	..	..	..	..	..
298.	Chillies, green	24	6.5	217	1.55	34	15	..	16
301.	Coriander	..	32.0	990	..	..	..	..	..
302.	Cumin seeds	..	126.0	980	..	..	..	..	..

Trace elements and acid-base balance—*Contd.*

Sl.No.	Name of foodstuff	Magnesium	Sodium	Potassium	Copper	Sulphur	Chlorine	Acid-base balance ml. 0.1 N	
		mg.	*mg.*	*mg.*	*mg.*	*mg.*	*mg.*	*Acid*	*Base*
303.	Fenugreek seeds ..	..	19.0	530	..	..	..	..	.
311.	Omum	..	56.0	1,390	..	..	..	..	..
315.	Turmeric.. ..	..	25.0	3,300	..	..	..	..	..
	FRUITS								
317.	Amla	..	5.0	225	0.18	..	..	..	..
318.	Apple	7	28.0	75	0.13	7	1	..	24
319.	Apricots, fresh ..	..	..	430	0.11	..	..	..	..
322.	Bael fruit ..	..	..	600	0.21	..	..	..	..
325.	Banana, ripe ..	34	36.6	88	0.40	7	8	..	45
327.	Bilimbi	..	..	130	0.05	..	..	..	..
332.	Cape gooseberry ..	31	0.9	320	0.19	43	12	..	39
335.	Cherries, red ..	..	..	320	0.02	..	..	..	..
347.	Guava, country ..	8	5.5	91	0.34	14	4	..	9
351.	Jack fruit ..	27	41.1	191	0.23	69	9	..	27
353.	Jambu fruit ..	35	26.2	55	0.23	13	8	..	41
357.	Korukkapalli ..	40	3.7	377	0.60	109	51	..	24
361.	Lemon	..	..	270	0.16	..	..	..	..
362.	Lemon, sweet ..	..	..	210	0.11	..	..	..	..
363.	Lichis	10	124.9	159	0.30	19	3	..	73
366.	Lime, sweet, Malta ..	..	..	170	0.51	..	..	..	..
367.	Lime, sweet, Musammi ..	.		490	0.17	..	..	..	..
368.	Loquat	..	..	390	0.13	..	..	..	..

Trace elements and acid-base balance—*Contd.*

Sl.No.	Name of foodstuff	Magnesium	Sodium	Potassium	Copper	Sulphur	Chlorine	Acid-base balance (ml. 0.1 N)	
		mg.	*mg.*	*mg.*	*mg.*	*mg.*	*mg.*	*Acid*	*Base*
370.	Mango, ripe ..	27	26.0	205	0.20	17	3	..	67
374.	Melon, musk ..	31	104.6	341	0.03	32	80	..	135
375.	Melon, water .	13	27.3	160	0.05	42	21	..	29
380.	Orange	9	4.5	93	0.58	7	5	..	40
386.	Papaya, ripe ..	11	6.0	69	0.20	13	11	..	18
389.	Peaches	21	2.0	453	0.06	26	0	..	99
390.	Pears	7	6.1	96	0.40	14	1	..	21
393.	Phalsa	72	4.4	351	0.12	13	86	..	158
394.	Pineapple ..	20	34.7	37	0.36	20	13	..	29
397.	Plums	147	0.8	247	0.13	33	0	..	213
398.	Pomegranate ..	12	0.9	133	0.17	12	2	..	35
405.	Rose apple ..	4	34.1	50	0.01	13	4	..	6
406.	Sapota	26	5.9	269	0.36	17	26	..	90
407.	Sectaphal .	48	..	340	0.52	.	37	..	..
411.	Thavittu pazham .	30	7.7	106	0.15	30	19	..	41
413.	Tomato, ripe .	12	12.9	146	0.14	11	6	..	55
414.	Tomatillo ..	23	0.4	243	0.09	27	14	.	38
415.	Tree tomato	34	1.7	539	0.17	37	10	.	117
417.	Vikkapazham ..	37	3.9	435	0.08	68	85	.	79
418.	Wood apple	..	..	..	0.81	..	..	..	..
	FISHES AND OTHER SEA-FOODS								
420.	Air	..	..	..	0.06	..	..	..	..

Trace elements and acid-base balance—*Contd.*

Sl. No.	Name of foodstuff	Magnesium	Sodium	Potassium	Copper	Sulphur	Chlorine	Acid-base balance	
								ml. 0.1 N	
		mg.	*mg.*	*mg.*	*mg.*	*mg.*	*mg.*	*Acid*	*Base*
421.	Amlet ..	..	..	..	..	0.14	..	..	..	..
423.	Bacha ..	..	..	..	..	0.11	..	..	..	..
425.	Bam ..	..	..	..	..	0.06	..	..	..	..
427.	Bata (small varieties)	..	..	..	0.17	..	..	..	..	..
432	Bhetki, fresh	..	..	66.0	173	0.11	..	..	..	..
434.	Bhole ..	..	..	..	..	0.05	..	..	..	..
437.	Boal ..	..	..	..	..	0.08	..	..	..	..
442.	Chela, dried	..	..	..	..	0.51	..	..	..	..
444.	Chiki, dried	..	..	..	..	1.70	..	..	..	..
445.	Chingri, goda, dried	..	..	..	1.40	..	..	..	..	..
446.	Chital ..	..	..	34.0	119	0.17	..	..	..	..
449.	Dhain ..	..	..	..	..	0.08	..	..	..	..
452.	Fish meal	..	61	106.0	338	0.05	755	130	422	..
460.	Hilsa ..	..	..	52.0	183	0.14	..	..	..	..
465.	Joyali magur, dried	..	..	..	..	0.67	..	..	..	..
467.	Katla ..	..	..	50.0	151	0.12	..	..	..	..
468.	Kholshe	..	..	..	..	0.10	..	..	..	..
469.	Khorsula	..	..	..	..	0.13	..	..	..	..
472.	Koi ..	..	..	64.0	195	0.16	..	30	..	..
475.	Lady vendi	..	..	..	..	0.23	..	..	..	..
480.	Magur ..	..	..	58.0	147	..	..	..	..	..
481.	Mahasole	..	..	..	..	0.12	..	..	..	..

Trace elements and acid-base balance—*Contd.*

Sl. No.	Name of foodstuff	Magnesium	Sodium	Potassium	Copper	Sulphur	Chlorine	Acid-base balance	
								ml. 0.1 N	
		mg.	*mg.*	*mg.*	*mg.*	*mg.*	*mg.*	*Acid*	*Base*
484.	Modal machh, dried	..	..	..	0.90	..	..	..	..
486.	Mowrala	..	..	..	0.07	..	..	..	..
487.	Mrigal ..	..	..	..	0.12	..	..	..	..
493.	Pabda ..	..	..	..	0.09	..	..	..	..
494.	Pakal ..	..	..	..	0.06	..	..	..	..
495.	Palmplate	..	..	..	0.12	..	..	..	..
496.	Pangas ..	..	..	..	0.05	..	..	..	..
497.	Parsey, fresh	..	..	..	0.14	..	..	..	..
503.	Prawn	..	66.0	262	..	..	..	..	..
510.	Rohu ..	13	101.0	288	0.13	103	3	..	275
511.	Royna ..	..	..	..	0.05	..	..	..	..
512.	Rupapatar, dried	..	..	..	1.10	..	..	..	..
515.	Sarputi ..	..	..	..	0.08	..	..	..	..
516.	Shanka chur, dried	..	..	..	0.76	..	..	..	..
523.	Singhi ..	..	53.0	223	0.15	..	..	..	..
525.	Sole ..	..	..	..	0.11	..	..	..	..
529.	Taltapra, dried	..	..	..	0.82	..	..	..	..
530.	Tapra, dried	..	..	..	0.71	..	..	..	..
531.	Tapsi, dried	..	..	..	1.20	..	..	..	..
536.	Tengra, dried	..	..	..	0.58	..	..	..	..
	OTHER FLESH FOODS								
541.	Beef muscle	..	52.0	214	..	..	..	..	..

Trace elements and acid-base balance—*Concld.*

Sl. No.	Name of foodstuff	Magnesium	Sodium	Potassium	Copper	Sulphur	Chlorine	Acid-base balance ml. 0.1 N	
		mg.	*mg.*	*mg.*	*mg.*	*mg.*	*mg.*	*Acid*	*Base*
554.	Liver (goat)	..	73.0	166	..	..	..	..	..
556.	Mutton	..	33.0	270	..	..	..	..	..
	MILK AND MILK PRODUCTS								
567.	Milk, buffalo's	..	19.0	90	..	..	..	..	..
568.	Milk, cow's	..	16.0	140	..	..	15	..	..
569.	Milk, goat's	..	11.0	110	..	..	..	..	..
572.	Curds	..	32.0	130	..	..	..	..	..
	MISCELLANEOUS FOODSTUFFS								
592.	Arrowroot flour	3.0	20	..	..	..	..	..	..
594.	Bajjar bhang ..	405	..	..	..	..	29	..	..
597.	Bhangari ..	234	..	..	..	..	4	..	..
598.	Bhangari-ka-atta ..	182	10.8	413	0.51	79	2	..	23
599.	Bhiliso of elo	..	..	..	..	..	118	..	..
600.	Bhoose-ka-atta ..	150	13.8	546	0.51	77	76	..	44
609.	Chookri-ka-atta ..	216	15.8	332	0.34	84	60	..	611
610.	Chookri-ka-patta ..	372	15.8	469	0.46	13	67	..	1,874
612.	Chukary	..	..	..	..	..	102	..	..
616.	Coconut meal (deoiled) ..	355	72.5	2,003	..	431	374	..	99
620.	Elo	156	..	..	..	86	..	..	..
624.	Jack fruit seeds ..	54	63.2	246	0.19	356	14	103	..
632.	Lamtra	..	..	..	..	..	143	..	..
644.	Pachwai (Assam) ..	51	..	110	..	25	..	..	..
650.	Rajkeera seeds ..	351	..	..	0.63	174	9	..	..

TABLE 3

OXALIC ACID AND PHYTIN PHOSPHORUS

Sl. No.	Name of foodstuff	Oxalic acid	Phytin P	Phytin P as per cent of total P
		mg/100 gms.		
	CEREAL GRAINS AND PRODUCTS			
1.	Bajra	21	141	48
4.	Barley	2	101	47
5.	Buck wheat	0	322	91
6.	Italian millet	0	198	68
8.	Jowar	10	172	77
9.	Maize, dry	6	306	85
10.	Maize, tender	9	66	55
12.	Panivaragu	0	83	40
13.	Ragi	0	209	74
15.	Rice, parboiled, milled	1	83	58
17.	Rice, raw, milled	3	83	52
19.	Rice flakes	0	151	63
20.	Rice puffed	0	47	31
21.	Samai	0	57	26
24.	Varagu	0	135	72
25.	Vermicelli	0	19	21
26.	Wheat, Bulgar	7	198	67
27.	Wheat, whole..	8	238	80
29.	Wheat flour (refined)	0	38	31
	PULSES AND LEGUMES			
31.	Bengal gram (whole)	2	158	51
32.	Bengal gram dhal	5	133	40
33.	Bengal gram, roasted, dehusked ..	3	159	47

Oxalic acid and Phytin Phosphorus—*Contd.*

Sl. No.	Name of foodstuff	Oxalic acid mg/100 gms.	Phytin P mg/100 gms.	Phytin P as per cent of total P
34.	Blackgram dhal	16	169	43
35.	Cow pea	9	185	45
36.	Field bean, dry		248	57
37.	Greengram (whole)	3	148	46
38.	Greengram dhal	1	209	52
39.	Horse gram	417	114	37
40.	Khesari dhal	122	108	31
41.	Lentil	14	100	34
42.	Moth beans	0	25	11
43.	Peas, dry	0	135	45
44.	Peas, roasted	0	136	40
46.	Redgram dhal	9	170	56
	LEAFY VEGETABLES			
51.	Amaranth, tender	772	2	3
54.	Bamboo, tender shoots	2	..	..
60.	Brussels sprouts	4	5	6
61.	Cabbage	3	3	7
64.	Celery leaves	37	6	4
72.	Colocasia leaves (green variety) ..	43	0	0
74.	Coriander leaves	47	0	0
76.	Curry leaves	132	35	61
77.	Drumstick leaves	101	44	63
78.	Fenugreek leaves	13	0	0
84.	Gogu	148	..	..
110.	Mint	33	4	6

Oxalic acid and Phytin Phosphorus *Contd.*

Sl. No.	Name of foodstuff	Oxalic acid mg/100 gms.	Phytin P mg/100 gms.	Phytin P as per cent of total P.
116.	Neem leaves, tender	152	104	55
120.	Parsley	..	16	9
121.	Paruppu keerai	1,679	4	9
134.	Safflower leaves	3	..	..
144.	Spinach	658	0	0
149.	Tamarind leaves, tender	196	0	0
	ROOTS AND TUBERS			
163.	Beet root	40	0	0
167.	Carrot	5	0	0
173.	Gotigadde	15	20	10
182.	Onion, big	1	..	..
183.	Onion, small	1	..	..
184.	Parsnip	20	4	10
185.	Potato	20	14	35
186.	Radish, pink	20	13	65
189.	Radish, white..	9	0	0
192.	Tapioca	17	..	..
193.	Tapioca chips, dried	31	17	24
197.	Yam (elephant)		4	12
199.	Yam (wild)	15	7	9
	OTHER VEGETABLES			
208.	Bitter gourd	0	4	6
209.	Bitter gourd, small variety ..	0	26	19
212.	Brinjal	18	3	6
213.	Broad beans	1	..	..

Oxalic acid and Phytin Phosphorus *Contd.*

Sl. No.	Name of foodstuff	Oxalic acid mg/100 gms.	Phytin P mg/100 gms.	Phytin P as per cent of total P.
214.	Cauliflower	19	10	18
215.	Celery stalks	30	1	3
218.	Cluster beans		3	6
221.	Cucumber	15	0	0
222.	Double beans..		8	5
223.	Drumstick	101	44	40
225.	Field beans, tender	1	..	..
227.	French beans	31	0	0
238.	Knol-khol	10	0	0
239.	Ladies fingers..	8	0	0
242.	Lotus stem, dry	422	0	0
243.	Mango, green	6	5	26
247.	Onion stalks	14	19	38
249.	Parwar	7	8	20
250.	Peas	14	55	40
251.	Pink beans		38	54
252.	Plantain flower	420	..	..
253.	Plantain, green	480	11	37
258.	Red gram, tender	16	..	..
260.	Ridge gourd	27	11	28
264.	Snake gourd	34	0	0
265.	Spinach stalks	1	..	..
269.	Tinda, tender	2	..	..
270.	Tomato, green	2	0	0
271.	Vegetable marrow	56	..	..

Oxalic acid and Phytin Phosphorus—*Contd.*

Sl. No.	Name of foodstuff	Oxalic acid mg/100 gms.	Phytin P mg/100 gms.	Phytin P as per cent of total P.
	NUTS AND OILSEEDS			
275.	Almond	407	..	..
276.	Cashewnut	318	..	..
280.	Garden cress seeds	149	442	61
281.	Gingelly seeds	1,700	..	..
284.	Jungli badam	0	197	48
290.	Piyal seeds	2	158	30
	CONDIMENTS AND SPICES			
294.	Arisithippili	..	56	17
297.	Chillies, dry	..	71	19
298.	Chillies, green	67	7	9
301.	Coriander	..	320	81
302.	Cumin seeds	..	153	30
303.	Fenugreek seeds	..	151	41
311.	Omum	..	296	67
312.	Pepper, dry	..	115	58
315.	Turmeric	..	97	34
	FRUITS			
317.	Amla	296	..	..
318.	Apple	10	0	0
325.	Banana, ripe	..	4	10
332.	Cape goosebery	1	18	27
347.	Guava, country	14	15	54
351.	Jack fruit	27	17	41
353.	Jambu fruit	89	2	13

Oxalic acid and Phytin Phosphorus—*Contd.*

Sl. No.	Name of foodstuff	Oxalic acid mg/100 gms.	Phytin P mg/100 gms.	Phytin P as per cent of total P.
363.	Lichis	19	..	..
370.	Mango, ripe	26	..	..
374.	Melon, musk	2	..	..
375.	Melon, water	11	..	..
380.	Orange	10	1	5
386.	Papaya, ripe	1	4	31
389.	Peaches	1	1	2
390.	Pears	4	1	10
393.	Phalsa	200	13	33
394.	Pineapple	5	2	22
397.	Plum	1	0	0
398.	Pomegranate	14	11	28
407.	Seetaphal	30	..	..
411.	Thavittu pazham	42	11	73
413.	Tomato, ripe	4	..	..
414.	Tomatillo	0	7	18
415.	Tree tomato	1	6	13
417.	Vikkipazham	11	5	19
418.	Wood apple	272	..	..
	FISHES AND OTHER SEA FOODS			
510.	Rohu	5	18	10
	OTHER FLESH FOODS			
540.	Beef meal		90	28
541.	Beef, muscle	25	..	..
556.	Mutton	7	..	..

Oxalic acid and Phytin Phosphorus—*Concld.*

Sl. No.	Name of foodstuff	Oxalic acid mg/100 gms.	Phytin P mg/100 gms.	Phytin P as per cent of total P.
	MILK AND MILK PRODUCTS			
568.	Milk, cow's	2	..	..
	MISCELLANEOUS FOODSTUFFS			
597.	Bhangari	124	..	..
598.	Bhangari-ka-atta	66	39	12
600.	Bhoose-ka-atta	0	121	37
609.	Chookri-ka-atta	1,494	8	5
610.	Chookri-kaptta	6,223	0	0
616.	Coconut meal, deoiled	..	285	44
624.	Jackfruit seeds	4	40	42
650.	Rajkeera seeds	29	..	..

TABLE 4.

FOLIC ACID

(*μg per 100 gms. edible portion*)

Sl. No.	Name of foodstuff	Folic Acid	
		Free	Total
	CEREAL GRAINS AND PRODUCTS		
1.	Bajra	14.7	45.5
6.	Italian Millet	4.2	15.0
8.	Jowar	14.0	20.0
9.	Maize, dry	14.0	20.0
11.	Oatmeal	32.0	34.0
13.	Ragi	5.2	18.3
15.	Rice, parboiled, milled	8.9	11.0
17.	Rice, raw, milled	4.1	8.0
21.	Samai	2 2	9.0
24.	Varagu	7.4	23.1
27.	Wheat, whole	14.2	36.6
28.	Wheat flour (whole)	12.1	35.8
	PULSES AND LEGUMES		
31.	Bengal gram, whole	34.0	186.0
32.	Bengal gram dhal	32.0	147.5
33.	Bengal gram (roasted)	22.0	139.0
34.	Black gram dhal..	24.0	132.0
35.	Cowpea	69.0	133.0
38.	Green gram dhal	24.5	140.0
41.	Lentil	14.5	36.0
43.	Peas, dry	4.6	7.5

Folic acid—*Contd.*

Sl. No.	Name of foodstuff	Folic Acid	
		Free	Total
46.	Red gram	19.0	103.0
47.	Soya bean	8.65	100.0
	LEAFY VEGETABLES		
51.	Amaranth	41.0	149.0
52.	Ambat chuka	40.0	125.0
61.	Cabbage	13.3	23.0
76.	Curry leaves	23.5	93.9
110.	Mint	9.7	114.0
144.	Spinach	51.0	123.0
	ROOTS AND TUBERS		
167.	Carrot	5.0	15.0
170.	Colocasia	16.0	54.0
182.	Onion, big	1.5	6.0
185.	Potato	3.0	7.0
198.	Yam (ordinary)	0.9	17.5
	OTHER VEGETABLES		
212.	Brinjal	5.0	34.0
218.	Cluster beans	50.0	144.0
221.	Cucumber	12.6	14.7
227.	French beans	15.5	45.5
237.	Kovai	18.0	59.0
239.	Ladies fingers	25.3	105.1
253.	Plantain, green	1.6	16.4
255.	Pumpkin	3.0	13.0
264.	Snake gourd	7.5	15.5

Folic acid—*Contd.*

Sl. No.	Name of foodstuff	Folic Acid	
		Free	Total
	NUTS AND OIL SEEDS		
278.	Coconut, dry	15.3	16.5
279.	Coconut, fresh	11.7	12.5
281.	Gingelly seeds	51.0	134.0
282.	Groundnut	16.0	20.0
	CONDIMENTS AND SPICES		
298.	Chillies, green	6.0	29.0
301.	Coriander	27.4	32.0
303.	Fenugreek seeds	14.5	84.0
315.	Turmeric	10.0	18.0
	FRUITS		
413.	Tomato, ripe	14.0	30.0
	FISHES AND OTHER SEA FOODS		
487.	Mrigal	9.7	16.7
519.	Shrimp, fresh	15.7	18.6
	OTHER FLESH FOODS		
543.	Buffalo meat	4.6	7.8
546.	Egg, duck	80.0	80.0
547.	Egg, hen	70.3	78.3
551.	Fowl..	3.2	6.8
552.	Goat meat	0.5	4.5
554.	Liver, goat	61.2	176.2
555.	Liver, sheep	65.6	188.0
556.	Mutton	1.0	5.8

Folic acid—*Concld.*

Sl. No.	Name of foodstuff	Folic Acid	
		Free	Total
	MILK AND MILK PRODUCTS		
567.	Milk, buffalo	3.3	5.6
568.	Milk, cow	5.6	8.5
569.	Milk, goat	0.7	1.3
570.	Milk, human	1.3	..
572.	Curd..	3.3	12.5
	MISCELLANEOUS FOODSTUFFS		
596.	Betel leaves	3.1	19.0
663.	Yeast, dried	150.0	1640.0

TABLE 5

VITAMIN B_{12}

(*μg. per 100 grams edible portion*)

Sl. No.	Name of foodstuff	Vitamin B_{12}
	FISHES	
487.	Mrigal ..	.. 1.4
519.	Shrimp, fresh	.. 9.0
	OTHER FLESH FOODS	
543.	Buffalo meat ..	.. 1.7
547.	Egg, hen, whole	.. 1.8
547.	Egg white (hen)	.. 0.2
547.	Egg yolk (hen)	.. 4.4
552.	Goat meat ..	.. 2.8
554.	Liver, goat ..	.. 90.4
555.	Liver, sheep ..	.. 91.9
556.	Mutton ..	.. 2.6
	MILK AND MILK PRODUCTS	
567.	Milk, buffalo ..	.. 0.14
568.	Milk, cow ..	.. 0.14
569.	Milk, goat ..	.. 0.05
570.	Milk, human	.. 0.02
572.	Curd, buffalo milk	.. 0.10
572.	Curd, cow milk	.. 0.13
582.	Skim milk powder	.. 0.83

TABLE 6.

CHOLINE

(*mg. per 100 gms. edible portion*)

Sl. No.	Name of foodstuff	Choline
	CEREAL GRAINS AND PRODUCTS	
12.	Panivaragu	748
16.	Rice, raw, hand pounded..	77
27.	Wheat, whole ..	206
	PULSES AND LEGUMES	
31.	Bengal gram, whole ..	194
34.	Black gram dhal ..	206
35.	Cow pea	202
36.	Field bean, dry ..	352
37.	Green gram, whole ..	167
41.	Lentil	299
43.	Peas, dry	235
46.	Red gram dhal ..	183
	LEAFY VEGETABLES	
51.	Amaranth, tender ..	31
54.	Bamboo, tender shoots ..	8
61.	Cabbage	120
101.	Lettuce	178
	ROOTS AND TUBERS	
163.	Beet root	242
167.	Carrot	168
185.	Potato	100
189.	Radish, white ..	63
194.	Turnip	137
	OTHER VEGETABLES	
212.	Brinjal	52
213.	Broad beans	5
214.	Cauliflower	127
225.	Field bean, tender ..	4
250.	Peas	20
251.	Pink beans	33
252.	Plantain flower ..	5
255.	Pumpkin	136
258.	Red gram, tender ..	72
	NUTS AND OIL SEEDS	
282.	Groundnut ..	224
286.	Mustard seeds ..	211
	CONDIMENTS AND SPICES	
296.	Cardamom	1,550
301.	Coriander	1,077
302.	Cumin seeds	1,065
303.	Fenugreek seeds ..	1,161
	FRUITS	
317.	Amla	256

Choline—*Concld.*

Sl. No.	Name of foodstuff	Choline
318.	Apple	321
353.	Jambu fruit	7
394.	Pineapple	8
	FISHES AND OTHER SEA-FOODS	
425.	Bam	438
428.	Bele	388
432.	Bhetki	349
437.	Boal	108
446.	Chital	943
453.	Folui	1,018
460.	Hilsa	1,364
466.	Kalabasu	716
467.	Katla	611
472.	Koi	891
480.	Magur	639
487.	Mrigal	480
493.	Pabda	1,018
496.	Pangas	913
503.	Prawn	542
504.	Puti	393
510.	Rohu	819
523.	Singhi	64
525.	Sole	572
535.	Tengra	783
	MISCELLANEOUS FOODSTUFFS	
624.	Jack fruit seed ..	52

TABLE 7.

ESSENTIAL AMINO ACIDS

S. No.	Name of foodstuff	Approximate total N	Arginine	Histidine	Lysine	Tryptophan	Phenylalanine	Tyrosine	Methionine	Cystine	Threonine	Leucine	Isoleucine	Valine
		g/100 *gms.*	*gm. per gm. N*											
	CEREAL GRAINS AND PRODUCTS													
1.	Bajra ..	.. 1.86	0.30	0.14	0.19	0.11	0.29	0.20	0.15	0.11	0.24	0.75	0.26	0.33
2.	Bamboo seeds ..	.. 2.96	0.56	0.13	0.29	0.05	0.27	0.20	0.11	0.13	0.23	0.48	0.31	0.37
3.	Banti ..	.. 1.33	..	..	0.18	0.03	0.20	..	0.12	..	0.14	1.04	0.55	0.40
4.	Barley ..	.. 1.84	0.30	0.18	0.23	0.10	0.31	0.18	0.10	0.10	0.20	0.42	0.24	0.31
5.	Buckwheat ..	.. 1.65	0.57	0.13	0.30	0.08	0.24	0.14	0.10	0.11	0.22	0.38	0.24	0.37
6.	Italian millet ..	.. 1.97	0.22	0.13	0.14	0.06	0.42	..	0.18	0.10	0.19	1.04	0.48	0.43
7.	Job's tears ..	.. 2.80	0.27	0.13	0.13	0.03	0.30	0.27	0.16	0.11	0.20	1.02	0.30	0.36
8.	Jowar ..	.. 1.66	0.24	0.16	0.15	0.07	0.30	0.18	0.10	0.09	0.21	0.88	0.27	0.34
9.	Maize, dry ..	.. 1.78	0.29	0.16	0.20	0.04	0.29	0.24	0.12	0.10	0.28	0.72	0.24	0.30
11.	Oat meal ..	.. 2.18	0.39	0.11	0.23	0.08	0.30	0.21	0.10	0.09	0.20	0.44	0.27	0.33

Essential Amino Acids—*Contd.*

S. No.	Name of foodstuff	Total N	Arg.	His.	Lys.	Trp.	Phe.	Tyr.	Met.	Cys.	Thr.	Leu.	Ile.	Val.
		gms %	*gm. per gm. N*											
12.	Panivaragu ..	.. 2.00	0.29	0.11	0.19	0.05	0.31	..	0.16	..	0.15	0.76	0.41	0.41
13.	Ragi ..	.. 1.17	0.30	0.13	0.22	0.10	0.31	0.22	0.21	0.14	0.24	0.69	0.40	0.48
15.	Rice, parboiled, milled	.. 1.02	0.64	0.19	0.22	0.07	0.35	0.30	0.22	0.10	0.29	0.56	0.31	0.46
17.	Rice, raw, milled	.. 1.09	0.48	0.13	0.23	0.08	0.28	0.29	0.15	0.09	0.23	0.50	0.30	0.38
21.	Samai ..	.. 1.23	0.25	0.12	0.11	0.06	0.33	..	0.18	0.09	0.19	0.76	0.37	0.35
24.	Varagu ..	.. 1.33	0.27	0.12	0.15	0.05	0.43	..	0.18	0.11	0.20	0.65	0.36	0.41
27.	Wheat, whole ..	.. 1.89	0.29	0.13	0.17	0.07	0.28	0.18	0.09	0.14	0.18	0.41	0.22	0.28
29.	Wheat flour, refined	.. 1.76	0.19	0.12	0.11	0.06	0.29	0.13	0.09	0.14	0.15	0.40	0.22	0.24
30.	Wheat germ ..	.. 4.67	0.46	0.16	0.38	0.07	0.23	0.19	0.11	0.10	0.26	0.41	0.24	0.30
	PULSES AND LEGUMES													
31.	Bengal gram (whole)	.. 2.74	0.57	0.16	0.44	0.05	0.36	0.18	0.08	0.08	0.22	0.58	0.32	0.31
34.	Black gram dhal	.. 3.84	0.52	0.17	0.40	0.07	0.31	0.14	0.09	0.08	0.22	0.50	0.34	0.31
35.	Cow pea ..	.. 3.86	0.42	0.20	0.43	0.07	0.32	0.23	0.09	0.08	0.23	0.48	0.27	0.31
36.	Field bean ..	.. 3.98	0.53	0.18	0.50	0.03	0.33	..	0.04	0.08	0.25	0.55	0.36	0.31

S. No.	Name of foodstuff	Total N *gms %*	Arg.	His.	Lys.	Trp.	Phe.	Tyr.	Met.	Cys.	Thr.	Leu.	Ile.	Val.
			gm. per gm. N											
37.	Green gram, whole	3.84	0.50	0.17	0.46	0.06	0.35	0.10	0.08	0.06	0.20	0.51	0.35	0.32
39.	Horsegram	3.52	0.53	0.19	0.52	0.07	0.38	..	0.07	0.13	0.23	0.54	0.37	0.39
40.	Khesari dhal	4.51	0.49	0.16	0.47	0.05	0.26	..	0.03	0.07	0.14	0.41	0.41	0.25
41.	Lentil	4.02	0.54	0.16	0.44	0.06	0.27	0.20	0.05	0.07	0.22	0.47	0.27	0.31
42.	Moth bean	3.78	..	0.21	0.34	0.04	0.28	..	0.06	0.03	..	0.42	0.31	0.20
43.	Peas, dry	3.15	0.57	0.13	0.44	0.06	0.28	0 17	0.05	0.07	0.24	0.43	0.28	0.30
45.	Rajmah	3.56	0.37	0.18	0.46	0.06	0.34	0.10	0.06	0.04	0.27	0.47	0.30	0.33
46.	Red gram dhal	3.57	0.36	0.25	0.48	0.04	0.46	0.13	0.06	0.06	0.20	0.45	0.25	0.26
47.	Soya bean	6.91	0.45	0.15	0.40	0.08	0.30	0.21	0.08	0.10	0.24	0.48	0.32	0.32
	LEAFY VEGETABLES													
49.	Agathi	1.34	0.36	0.12	0.25	0.10	0.38	..	0.09	0.09	0.30	0.56	0.39	0.43
51.	Amaranth, tender	0.64	0.24	0.13	0.25	0.07	0.18	0.19	0.07	0.04	0.14	0.37	0.29	0.28
55.	Bathua leaves	0.59	..	..	0.75	0.02	0.11	..	0.05	..	0.17	0.41	0.44	0.29
56.	Beet greens	0.54	0.18	0.09	0.21	0.06	0.19	0.15	0.05	0.06	0.20	0.30	0.18	0.21

ESSENTIAL AMINO ACIDS—*Contd.*

S. No.	Name of foodstuff	Total N *gms %*	Arg.	His.	Lys.	Trp.	Phe.	Tyr.	Met.	Cys.	Thr.	Leu.	Ile.	Val.
			gm. per gm. N											
58.	Bottlegourd leaves	0.37	0.28	0.14	0.30	..	0.31	..	0.09	0.07	0.22	0.41	0.26	0.04
60.	Brussels sprouts..	0.75	0.39	0.14	0.34	0.08	0.23	..	0.06	0.04	0.27	0.34	0.31	0.30
61.	Cabbage	0.29	0.45	0.13	0.24	0.07	0.20	0.12	0.06	0.07	0.22	0.34	0.23	0.26
62.	Carrot leaves	0.82	0.27	0.12	0.28	0.09	0.41	..	0.11	..	0.28	0.44	0.28	0.34
71.	Colocasia leaves	1.09	0.25	0.13	0.26	0.04	0.18	..	0.06	..	0.15	0.36	0.31	0.28
77.	Drumstick leaves	1.07	0.38	0.14	0.32	0.10	0.29	..	0.11	0.13	0.25	0.46	0.28	0.35
78.	Fenugreek leaves	0.70	0.35	0.11	0.30	0.08	0.30	..	0.09	..	0.20	0.39	0.33	0.32
84.	Gogu	0.27	0.31	0.09	0.40	0.04	0.20	..	0.07	..	0.21	0.44	0.32	0.24
94.	Knol-khol greens	0.56	..	..	0.54	0.37	0.16	..	0.05	..	0.13	0.50	0.33	0.31
101.	Lettuce	0.34	0.30	0.11	0.31	0.05	0.28	0.17	0.07	..	0.27	0.39	0.32	0.32
128.	Pumpkin leaves	0.74	0.43	0.10	0.34	0.08	0.34	0.31	0.11	0.06	0.31	0.63	0.31	0.36
134.	Safflower leaves	0.40	..	..	0.61	0.03	0.16	..	0.06	..	0.17	0.70	0.54	0.41
139.	Shepu	0.48	..	..	0.45	0.03	0.09	..	0.02	..	0.12	0.29	0.35	0.28
144.	Spinach	0.32	0.35	0.14	0.40	0.10	0.33	0.31	0.11	0.08	0.29	0.53	0.30	0.35

S. No.	Name of foodstuff	Total N *gms %*	Arg.	His.	Lys.	Trp.	Phe.	Tyr.	Met.	Cys.	Thr.	Leu.	Ile.	Val.
			gm. per gm. N											
149.	Tamarind leaves, tender ..	.. 0.92	0.37	0.14	0.30	..	0.39	0.22	0.08	0.06	0.29	0.58	0.33	0.36
153.	Turnip greens ..	.. 0.64	0.30	0.12	0.32	0.08	0.26	0.22	0.08	0.07	0.24	0.41	0.24	0.28
	ROOTS AND TUBERS													
163.	Beet root ..	.. 0.27	0.32	0.10	0.41	0.06	0.21	0.17	0.07	0.12	0.25	0.33	0.20	0.23
167.	Carrot ..	.. 0.14	0.25	0.09	0.23	0.04	0 21	0.14	0.07	0.06	0.21	0.31	0.23	0.31
170.	Colocasia ..	.. 0.48	0.47	0.11	0.30	0.11	0.32	0 23	0.08	0.16	0.28	0.51	0.27	0.38
182.	Onion ..	.. 0.19	0.17	0.07	0.29	0.09	0.18	..	0.07	..	0.09	0.17	0.09	0.14
185.	Potato ..	.. 0.26	0.33	0.10	0.32	0.10	0.27	0.17	0.09	0.05	0.22	0.38	0.27	0.31
189.	Radish ..	.. 0.11	0.70	0.16	0.27	0.02	0 27	..	0.05	..	0.23	0.42	0.30	0.39
191.	Sweet potato	.. 0.19	0.28	0.09	0.26	0.11	0.27	0.15	0.10	0.03	0.28	0.36	0.29	0.38
192.	Tapioca ..	.. 0.12	0.58	0.11	0.29	0.08	0 18	0.10	0.05	0.09	0.20	0.30	0.25	0.24
194.	Turnip ..	.. 0.08	0.25	0.07	0.23	0.08	0.18	..	0.05	0.01	0.21	0.34	0.22	0.23
198.	Yam (ordinary)	.. 0.22	0.48	0.12	0.28	0.07	0 30	0 20	0.10	..	0.22	0.40	0.23	0.29

ESSENTIAL AMINO ACIDS—*Contd.*

S. No.	Name of foodstuff	Total N gms %	Arg.	His.	Lys.	Trp.	Phe.	Tyr.	Met.	Cys.	Thr.	Leu.	Ile.	Val.
			gm. per gm. N											
	OTHER VEGETABLES													
205.	Ash gourd ..	.. 0.06	0.19	0.04	0.07	0.03	0.16	..	0.06	..	0.19	0.38	0.35	0.31
208.	Bitter gourd ..	.. 0.26	0.27	0.08	0.21	0.04	0.24	..	0.15	..	0.25	0.42	0.37	0.37
211.	Bottle gourd ..	.. 0.03	0.10	0.04	0.35	0.03	0.14	..	0.03	..	0.17	0.35	0.32	0.23
212.	Brinjal ..	.. 0.22	0.21	0.13	0.33	0.06	0.26	0.24	0.07	0.03	0.23	0.38	0.27	0.32
214.	Cauliflower ..	.. 0.42	0.29	0.12	0.36	0.09	0.23	..	0.10	..	0.26	0.44	0.30	0.35
215.	Celery stalks ..	.. 0.13	0.25	0.09	0.15	0.03	0.28	..	0.14	..	0.21	0.43	0.24	0.30
221.	Cucumber ..	.. 0.06	0.47	0.09	0.27	0.05	0.14	..	0.06	..	0.16	0.26	0.19	0.21
227.	French beans ..	.. 0.27	0.28	0.15	0.36	0.09	0.26	0.21	0.08	0.06	0.25	0.43	0.28	0.34
231.	Jack, tender ..	.. 0.42	0.12	0.06	0.30	0.08	0.48	..	0.09	0.09	0.36	0.50	0.45	0.55
239.	Ladies fingers ..	.. 0.30	0.23	0.11	0.21	0.04	0.14	0.27	0.08	0.06	0.14	0.24	0.15	0.19
250.	Peas ..	.. 1.15	0.57	0.13	0.40	0.06	0.25	0.22	0.06	0.08	0.24	0.38	0.29	0.29
253.	Plantain, green	.. 0.22	0.26	0.28	0.35	0.04	0.28	..	0.04	..	0.17	0.34	0.32	0.28
255.	Pumpkin ..	.. 0.22	0.23	0.10	0.27	0.07	0.21	..	0.05	..	0.17	0.33	0.23	0.30

S. No.	Name of foodstuff	Total N gms %	Arg.	His.	Lys.	Trp.	Phe.	Tyr.	Met.	Cys.	Thr.	Leu.	Ile.	Val.
			gm. per gm. N											
270.	Tomato, green ..	.. 0.30	0.19	0.05	0.16	0.02	0.15	..	0.05	..	0.19	0.21	0.42	0.27
	NUTS AND OILSEEDS													
275.	Almond ..	.. 3.33	0.66	0.14	0.16	0.05	0.30	0.18	0.10	0.05	0.17	0.45	0.25	0.31
276.	Cashew nut ..	.. 3.39	0.65	0.13	0.29	0.11	0.27	..	0.09	..	0.20	0.51	0.32	0.36
278.	Coconut, dry ..	.. 1.09	0.85	0.13	0 24	0.07	0.28	0.17	0.10	0.08	0.18	0.43	0.24	0.32
281.	Gingelly seeds ..	.. 2.93	0.75	0.17	0.17	0.08	0.37	0.23	0.18	0.12	0.23	0.50	0.25	0.29
282.	Groundnut ..	.. 4.05	0.69	0.14	0.23	0.06	0.31	0.24	0.06	0.08	0.17	0.40	0.24	0.28
285.	Linseed ..	.. 3.25	0.56	0.12	0.23	0.10	0.27	0.18	0.10	0.12	0.21	0 36	0.31	0.32
287.	Niger seed ..	.. 3.82	0.66	0.14	0.23	..	0.30	..	0.09	0.10	0.21	0.38	0.25	0.32
289.	Pistachio nut ..	.. 3.17	0.59	0.14	0.32	0.06	0.32	0.19	0.08	0.11	0.20	0.55	0.30	0.37
290.	Piyal seeds ..	.. 3.04	1.23	0.17	0.24	0.07	0.33	..	0.10	..	0.20	0.74	0.35	0.41
292.	Sunflower seeds	.. 3.17	0.50	0.15	0.23	0.09	0.28	0.12	0.12	0.09	0.23	0.40	0.27	0.32
293.	Walnut ..	.. 2.50	0.77	0.12	0.10	0.06	0.26	..	0.08	..	0.17	0.47	0.24	0.28

Essential Amino Acids—*Contd.*

S. No.	Name of foodstuff	Total N	Arg.	His.	Lys.	Trp.	Phe.	Tyr.	Met.	Cys.	Thr.	Leu.	Ile.	Val.
		gms %	*gm. per gm. N*											
	FRUITS													
318.	Apple	0.03	0.17	0.12	0.37	0.06	0.16	0.09	0.05	0.08	0.23	0.39	0.22	0.25
319.	Apricot	0.16	0.08	0.10	0.18	..	0.10	0.08	0.03	..	0.13	0.18	0.11	0.15
321.	Avocado pear	0.27	0.21	0.11	0.31	0.06	0.22	0.14	0.09	..	0.18	0.34	0.21	0.29
325.	Banana	0.19	0.36	0.37	0.27	0.07	0.26	0.16	0.08	0.17	0.19	0.32	0.25	0.26
338.	Dates	0.40	0.15	0.05	0.19	..	0.17	0.05	0.05	0.12	0.18	0.26	0.15	0.22
341.	Figs	0.21	0.14	0.09	0.25	0.05	0.15	0.27	0.05	0.10	0.20	0.27	0.19	0.24
344.	Grape	0.08	0.46	0.23	0.14	0.03	0.13	0.11	0.21	0.10	0.17	0.13	0.05	0.17
347.	Guava, country	0.14	..	..	0.19	0.06	..	..	0.06	..	..	..	..	..
370.	Mango, ripe	0.10	..	..	0.83	0.13	..	..	0.07	..	..	..	..	..
386.	Papaya	0.10	..	..	0.40	0.13	..	..	0.03	..	..	..	..	..
389.	Peaches	0.19	0.13	0.13	0.23	0.03	0.14	0.16	0.24	0.07	0.21	0.22	0.10	0.31
392.	Persimmon	0.11	0.36	0.13	0.32	0.11	0.29	0.15	0.06	0.15	0.38	0.40	0.28	0.29

S. No.	Name of foodstuff	Total N *gms %*	Arg.	His.	Lys.	Trp.	Phe.	Tyr.	Met.	Cys.	Thr.	Leu.	Ile.	Val.
			gm. per gm. N											
	FISH													
	Fish, fresh (all types including molluscs and crustaceans)	2.80	0.42	0.16	0.56	0.07	0.27	0.24	0.19	0.07	0.24	0.47	0.36	0.35
	OTHER FLESH FOODS													
541.	Beef	3.62	0.41	0.20	0.54	0.07	0.26	0.22	0.16	0.08	0.28	0.51	0.32	0.33
547.	Egg, hen	2.13	0.40	0.15	0.44	0.09	0.36	0.25	0.21	0.14	0.32	0.52	0.41	0.45
551.	Fowl	4.14	0.35	0.16	0.50	0.06	0.25	0.21	0.16	0.08	0.25	0.46	0.33	0.32
556.	Mutton	2.96	0.43	0.17	0.51	0.08	0.25	0.21	0.15	0.08	0.29	0.48	0.31	0.32
559.	Pork	2.99	0.41	0.19	0.57	0.09	0.28	0.23	0.18	0.08	0.31	0.52	0.34	0.36
	MILK AND MILK PRODUCTS													
567.	Milk, buffalo's	0.69	0.20	0.13	0.49	0.09	0.27	..	0.17	0.09	0.30	0.64	0.33	0.38
568.	Milk, cow's	0.51	0.22	0.17	0.50	0.09	0.32	0.30	0.16	0.05	0.28	0.60	0.34	0.40
569	Milk, goat's	0.53	0.21	0.18	0.47	0.08	0.24	0.20	0.11	..	0.35	0.56	0.25	0.34
570.	Milk human	0.18	0.25	0.17	0.42	0.11	0.23	0.23	0.10	0.11	0.29	0.52	0.33	0.31

ESSENTIAL AMINO ACIDS—*Concld.*

S. No.	Name of foodstuff	Total N *gms %*	Arg.	His.	Lys.	Trp.	Phe.	Tyr.	Met.	Cys.	Thr.	Leu.	Ile.	Val.
			gm. per gm. N											
572.	Curd	0.50	0.20	0.16	0.48	0.08	0.33	0.37	0.17	0.06	0.31	0.68	0.32	0.47
576.	Cheese	3.86	0.24	0.20	0.52	0.08	0.35	0.34	0.18	0.04	0.26	0.64	0.36	0.48
583.	Whole milk powder	4.13	0.22	0.18	0.49	0.09	0.31	0.30	0.17	0.05	0.28	0.63	0.36	0.42
	MISCELLANEOUS FOODSTUFFS													
589.	Adda seeds	4.37	0.53	0.09	0.26	0.05	0.20	..	0.06	..	0.19	0.41	0.26	0.26
624.	Jack fruit seeds	1.06	..	..	0.36	0.07	0.26	..	0.05	0.06	0.27	0.33	0.30	0.41
641.	Marking nut kernel	4.22	0.60	0.11	0.26	0.06	0.22	..	0.09	..	0.13	0.46	0.27	0.30
662.	Water melon seeds	5.46	0.90	0.13	0.17	0.09	0.27	..	0 16	..	0.14	0.40	0.31	0.26
663.	Yeast, dried (Brewer's)	6.32	0.31	0.16	0.57	..	0.30	0.26	0.10	0.06	0.35	0.50	0.37	0.46

TABLE 8

Poly-unsaturated fatty acids in some edible oils and fats

No.	Fat or Oil	PUFA content (*gms per* 100 *gms*)
1.	Coconut oil	2
2.	Cottonseed oil	50
3.	Ghee (Butter fat)	4
4.	Groundnut oil	28
5.	Maize oil (corn oil)	45
6.	Mustard oil	25
7.	Olive oil	10
8.	Rice bran oil	35
9.	Safflower oil (Kusuma oil)	75
10.	Sesame (Gingelly) oil	42
11.	Soyabean oil	55
12.	Vanaspati	6

APPENDIX

Names of Foodstuffs in Indian Languages

The following abbreviations have been used in this Appendix:

B.— Bengali; G.—Gujarati; H.—Hindi; Kan.—Kannada; Kash.— Kashmiri; Mal.— Mulayalam; Mar.— Marathi; O.—Oriya; P.— Punjabi; Tam.— Tamil; Tel.—Telugu.

CEREAL GRAINS AND PRODUCTS

1. Bajra: **Pennisetum typhoideum**
   B., H., O. *Bajra;* G., Mar. *Bajri;* Kan. *Sajje;* Kash. *Bajr'u;* Mal., Tam. *Cambu;* Tel. *Sazzalu.* Other names: Spiked millet, Pearl millet.

2. Bamboo seeds: **Bambusa arundi nacea**
   B. *Banser dhana;* H. *Bans ke beej;* Mal. *Mulaari;* Tam. *Moongil arisi;* Tel. *Veduru biyyam.*

3. Banti: **Echinochloa stagnina**
   B. *Dul;* Kan. *Kadu debhai hullu;* Mar. *Banti.*

4. Barley: **Hordeum vulgare**
   B. *Job;* G., H., Mar. *Jáu;* Kan. *Jave godhi;* Kash. *Wushku,* Mal. *Yavam;* O. *Jaba dhana;* Tam. *Barli arisi;* Tel. *Barli biyyam.*

5. Buckwheat: **Fagopyrum esculentum**
   B. *Titaphapur;* H., Mal., Mar., Tam. *Kootu.*

6. Italian millet: **Setaria italica**
   B. *Syama dhan;* G. *Ral kang;* H. *Kangni;* Kan. *Thene;* Kash. *Shol;* Mal. *Thina;* Mar. *Rala;* P. *Kaon;* Tam. *Thenai;* Tel. *Korralu;* Other names: Foxtail millet; Moha millet; *Kakan kora.*

7. Job's tears: **Coix lachryma**
   B. *Gurgur;* H. *Sankru;* Mar. *Ran makka;* Tam. *Netpavalam.*

8. Jowar: **Sorghum vulgare**
   B., G., H. *Juar;* Kan. *Jola;* Mal., Tam. *Cholam;* Mar. *Jwari;* O. *Janha;* Tel. *Jonnalu;* Other names: Milo, *Chari.*

9 10. Maize: **Zea mays**
   B. *Bhutta;* G. *Makai;* H., Mar., O. *Maka;* Kan. *Musikinu jola;* Kash. *Makaa'y;* Mal. *Cholam;* Tam. *Makka cholam;* Tel. *Mokka jonnalu.*

11. Oat meal: **Avena byzantina**
   B. *Jai;* G., H., Mar. *Jav;* Tel. *Yavalu.*

12. Panivaragu: **Panicum miliaceum**
   B., H. *Chinna;* Kan. *Baragu;* Kash. *Pingu;* Mal., Tam. *Panivaragu;* Mar. *Vari;* Tel. *Varagalu;* Other names: French millet.

13. Ragi: **Eleusine coracana**
   B., H. *Madua;* G. *Bhav;* Kan. *Ragi;* Mal. *Moothari;* Mar. *Nachni;* O. *Mandia;* Tam. *Kezhvaragu;* Tel. *Ragulu;* Other names: Finger millet; *Korakan.*

14. Rice, parboiled: **Oryza sativa**
15. B. *Siddha chowl;* G. *Ukadello chokha;* H. *Usna chawal;* Kan. *Kusubalakki;* Mal *Puzhungal ari;* Mar. *Ukda tandool;* O. *Usuna chaula;* Tam. *Puzhungal arisi;* Tel. *Uppudu biyyam.*

16. Rice, raw: **Oryza sativa**
17. B. *Chowl;* G. *Chokha;* H. *Chawal;* Kan. *Akki;* Kash. *Tomul;* Mal. *Ari;* Mar. *Tandool;* O. *Chaula;* Tam. *Arisi;* Tel. *Biyyam.*

COMMUNITY HEALTH CELL

18. Rice bran: **Oryza sativa**
B. *Goora*; Kan., Mal., Tam., Tel. *Thavudu;* Mar. *Konda.*

19. Rice flakes: **Oryza sativa**
B. *Chira;* G., Mar. *Pohe;* H. *Chewra;* Kan. *Avalakki;* Mal., Tam. *Aval;* O. *Chuda;* Tel. *Atukulu.*

20. Rice, puffed: **Oryza sativa**
B. *Mudi;* G., H., Mar. *Murmura;* Kan., Mal., Tam. *Pori;* O. *Mudhi;* Tel. *Murmuralu.*

21. Samai: **Panicum miliare**
B. *Kangni;* H. *Mutki;* Kan., Tam. *Samai;* Kash. *Ganuhaar;* Mal. *Chama;* Mar. *Sava;* O. *Suan;* Other names: *Goudli, Gondola.*

22. Sanwa millet: **Echinochloa frumantacea**
B. *China;* G. *Sama;* H. *Shama;* Mar. *Shamul;* Tam. *Kudirai valu;* Tel. *Chamalu;* Other names: *Sawank.*

23. Semolina: **Triticum aestivum**
B., H. *Sooji;* Kan., Mal., Mar., Tel. *Rawa;* Tam. *Ravai.* Other names: Broken wheat, Cream of wheat.

24. Varagu: **Paspalum scrobiculatum**
B. *Kodoadhan;* G., H. *Kodra;* Mal., Tam. *Varagu;* Mar. *Harik;* Tel. *Variaga;* Other names: *Pakodi, Manakodra.*

25. Vermicelli: **Triticum aestivum**
B. *Semai;* H. *Siwain;* Kan. *Shevige;* Mal., Tam., Tel. *Semiya;* Mar. *Shevaya;* O. *Simai.*

26. Wheat, Bulgar: **Triticum aestivum**

27. Wheat: **Triticum aestivum**
B. *Gom;* G. *Ghau;* H. *Gehun;* Kan. *Godhi;* Kash. *Ku'nu'kh;* Mal. *Gothambu;* Mar. *Gahu;* O. *Gahama;* P. *Kamak;* Tam. *Godumai;* Tel. *Godhumalu.*

28. Wheat flour, whole: **Triticum aestivum**
B., H., O. *Atta;* G. *Ato;* Kan. *Godhi hittu;* Mal. *Gothambu mavu;* Mar. *Kaneek;* Tam. *Godumai mavu;* Tel. *Godhuma pindi.*

29. Wheat flour, refined: **Triticum aestivum**
B., H., Kan., Mar., O. *Maida;* Mal., Tam. *Maida mavu;* Tel. *Maida pindi;* Other names: *American mavu.*

30. Wheat germ: **Triticum aestivum**
Tam. *Godumai muiai.*

PULSES AND LEGUMES

31. Bengal gram (whole): **Cicer arietinum**
B. *Chola;* G., H. *Chana;* Kan. *Kadale;* Kash. *Chanu;* Mal. *Kadala;* Mar. *Harbara;* O. *Buta;* P *Chole;* Tam. *Kothukadalai;* Tel. *Senagalu;* Other names: Chick pea, Garbanzo.

32. Bengal gram dhal: **Cicer arietinum**
B. *Cholar dal;* H. *Chane-ki-dal,* Kan. *Kadale bele;* Kash. *Cholu dal;* Mal. *Kadala parippu;* Ma *Harbara dal;* Tam. *Kadalai paruppu;* Tel. *Senaga pappu.*

33. Bengal gram, roasted: **Cicer arietinum**
B. *Chola bhaja;* G., Mar. *Phutana;* H. *Bhuna chana;* Kan. *Huri-kadale;* Mal. *Varutha kadala;* O. *Bhajabuta;* Tam. *Pottukadalai;* Tel. *Putnalu pappu.*

34. Black gram dhal: **Phaseolus mungo Roxb.**
B. *Mashkalair dal;* G. *Aalad;* H. *Urd dal;* Kan. *Uddina bele;* Kash. *Maha;* Mal. *Uzhunnu parippu;* Mar. *Uddachi dal;* O. *Biri;* P. *Mah-di-dal;* Tam *Ulutham paruppu;* Tel. *Minapa pappu.*

35. Cow pea: **Vigna catjang**
B. *Barbati;* H. *Lobia;* Kan. *Alasande;* Mal. *Payar;* Mar. *Chavli;* O. *Chani,* Tam. *Karamani;* Tel. *Bobbarlu.*

36. Field bean: **Dolichos lablab**
B. *Sim;* G., Mar. *Valpapdi;* H. *Val;* Kan. *Avare;* Kash. *Moang;* Mal. *Avara;* O. *Baragudi;* Tam. *Mochai;* Tel. *Chikkudu;* Other names: *Kadumal,* Hyacinth bean.

37. Green gram (whole): **Phaseolus aureus Roxb.**
B., G., *Mug;* H., Mar. *Mung;* Kan. *Hesare kalu;* Kash, *Muang;* Mal. *Cheru payaru;* O *Muga* P. *Moongi;* Tam. *Pasipayir;* Tel. *Pesalu.*

38. Green gram dhal: **Phaseolus aureus Roxb.**
B., Mar. *Mug dal;* H. *Mung dal;* Kan. *Hesara bele;* Mal. *Cheru payar parippu;* P *Mungi-di-dal;* Tam. *Payatham-paruppu;* Tel. *Pesara-pappu.*

39. Horse gram: **Dolichos biflorus**
B. *Kulthi-kalai;* G., Mar. *Kuleeth;* H. *Kulthi;* Kan. *Hurule;* Mal. *Muthira;* O. *Kolatha;* Tam. *Kollu;* Tel. *Ulavalu.*

40. Khesari dhal: **Lathyrus sativus**
B., H., O. *Khesari dal;* G., Mar. *Lakh dal;* Mal. *Vattu parippu;* Tam. *Khesari paruppu;* Tel. *Lamka pappu.*

41. Lentil: **Lens esculenta**
B. *Masoor;* G., H., Mar. *Masur dal;* Kan. *Masur bele;* Kash. *Musur;* Mal. *Masur parippu;* O. *Masura;* Tam. *Mysore paruppu;* Tel. *Misur pappu.*

42. Moth beans: **Phaseolus aconitifolius, Jacq.**
H. *Moth;* Mar. *Matki;* Tam. *Narippayir;* Other names: Dew gram, Aconite bean, *Kheri.*

43. Peas: **Pisum sativum**

44. B., H. *Matar;* G., Mar. *Vatana;* Kan., Tel. *Batani;* Kash. *Kara;* Mal., Tam. *Pattani;* O. *Matara;*

45. Rajmah: **Phaseolus vulgaris**
B. *Barbati;* G. *Phanasi;* H. *Rajmah;* Kash. *Raazmaha;* Mar. *Shravanghevda;* Other names: French bean (dry).

46. Red gram dhal: **Cajanus cajan**
B., H., Kash. *Arhar dal;* G. *Tuver;* Kan. *Thugare bele;* Mal. *Tuvara parippu;* Mar. *Tur dal;* O. *Harada;* Tam. *Tuvaram paruppu:* Tel. *Kandi pappu;* Other names: Pigeon pea.

47. Soya bean: **Glycine max Merr.**
B. *Garikalai;* H. *Bhatmas;* Kash. *Mutn.*

48. Sutari: **Phaseolus calcaratus**
Other name: Rice bean.

LEAFY VEGETABLES

49. Agathi: **Sesbania grandiflora**
B. *Bak;* G. *Agathio;* H., Mar. C. *Agasti;* Kan. *Agase;* Mal., Tam. *Agathi;* Tel. *Avise;* Other names: *Basna.*

50. Amaranth, spined: **Amaranthus spinosus**
B. *Kanta-notya;* G. *Kantalo dabho;* H. *Kantewali chaulai;* Kan. *Mulla dantu;* Mal. *Mullancheru-cheera;* Mar. *Kante-math;* O. *Kanta neutia saga;* Tam. *Mullu keerai;* Tel. *Mulla thotakoora;* Other names: *Gendari sag.*

51. Amaranth, tender: **Amaranthus gangeticus**
B. *Notya;* H. *Chaulai sag;* Kan. *Dantu;* Mal. *Cheera;* Mar. *Math;* Tam. *Thandukeerai;* Tel. *Thotakoora.* Other names: *Gogta sag.*

52. Ambat chuka: **Rumex vesicarius**
B. *Chuka palang;* H. *Chuka;* Kash. *O'bej*; Mar. *Ambat chuka;* Tam. *Chukka keerai;* Tel. *Chukka koora;* Other names: *Khatti palak.*

53. Araikeerai: **Amaranthus tristis**
Tam. *Araikeerai.*

54. Bamboo, tender shoots: **Bambusa arundinacea**
B. *Bansher-ankur;* G. *Vasasni kupal;* H. *Bans;* Mal. *Mulan koombu (elaya);* Mar. *Kalkipan;* O. *Baunsa gaja;* Tam. *Moongil kuruthu;* Tel. *Veduru chiguru;* Other names: *Chakrat.*

55. Bathua leaves: **Chenopodium album**
B. *Beto sag;* G. *Chilni bhaji;* H., P. *Bathua sag;* Kan. *Sakothina soppu;* Mar. *Chandan bathua*; O. *Bathua saga.*

56. Beet greens: **Beta vulagaris**
H. *Chukandar-ka-sag.*

57. Bengal gram leaves: **Cicer arietinum**
B. *Chola sag;* G. *Chanana pan;* H. *Chana sag;* Kan. *Kadale soppu;* Mal. *Kadala ilagal;* Mar. *Harbara pan;* O. *Chana saga;* P. *Chholianda sag;* Tam. *Kadalai ilaigal;* Tel. *Sanaga akulu.*

58. Bottle gourd leaves: **Lagenaria vulgaris**
B. *Lau sag;* H. *Lauki-ka-sag;* Kan. *Sorakay yele;* Mal. *Cheranga ilagal;* P. *Ghia da sag;* Tam. *Surai ilaigal;* Tel. *Anapa akulu;* Other names: Calabash cucumber leaves.

59. Broad been leaves: **Vicia faba**
H. *Bakala.*

60. Brussels sprouts: **Brassica oleracea, var. gemmifera**
B. *Bilati-bandhakopi;* H. *Chotee gobee;* Kan. *Mara kosu;* Kash. *Hua'kh;* O. *Chota bandha kobi;* Tam. *Kalakose.*

61. Cabbage: **Brassica oleracea var. capitata.**
B., O. *Bandha kopee;* G., Mar. *Kobi;* H., Kash. *Band gobee;* Kan. *Kosu;* Mal. *Mutta gose;* Tam. *Muttaikose*; Tel. *Gos koora;* Other name: *Pat gobee.*

62. Carrot leaves: **Daucus carota**
B., H. *Gajar sag;* G., Mar. *Gajar pan;* Kan. *Gajri soppu; soppu;* Mal. *Carrot ilagal;* O. *Gajara patra;* Tam. *Carrot keerai;* Tel. *Gajjara akulu;* P. *Gajar di sag.*

63. Cauliflower greens: **Brassica oleracea var. botrytis**
B. *Phool-kopi sag;* H., Mar. *Phool gobee sag;* Kan. *Hukosina yele.*

64. Celery leaves: **Apium graveolens var. dulce**
B. *Randhuni sag;* G. *Ajmana pan;* H. *Ajwan-ka-patta;* O. *Juani patra.*

65. Ceylon pasali: **Talinum triangulare**
Tam. *Ceylon pasali.*

66. Chakravarthi keerai: **Amarathus sp.**
Tam. *Chakravarthi keerai.*

67. Chekkur manis: **Sauropus androgynans**

68. Chimti sag: **Polygonum plebijum**

69. Chozhi keerai
Tam. *Chozhi keerai.*

70. Colombo keerai
Tam. *Kozhambu keerai.*

71-73. Colocasia leaves: **Colocasia antiquorum**
B. *Kochu sag;* H. *Arvi-ka-sag;* Kan. *Shamagadde yele;* Mal. *Chembu ilagal;* Mar. *Alu pan;* O. *Sarue;* Tam. *Seppam ilaigal;* Tel. *Chama akulu;* Other names: *Guan-ka-sag, Alti.*

74. Coriander leaves: **Coriandrum sativum**
B. *Dhane sag;* G. *Kothmer;* H. *Hara dhania;* Kan. *Kothambari soppu;* Kash. *Daaniwal;* Mal., Tam. *Kothamalli;* Mar. *Kothimbir;* O. *Dhania;* Tel. *Kothimiri.*

75. Cowpea leaves: **Vigna catjang**
Mal. *Payar ilagal;* Mar. *Chavli pan;* Other name: *Rawanda sag.*

76. Curry leaves: **Murraya koenigii**
B., O. *Bursunga;* G. *Mitha limbdo;* H. *Gandhela;* Kan. *Karibevu;* Mal. Tam. *Kariveppilai;* Mar. *Kadhi limb;* Tel. *Karivepaku.*

77. Drumstick leaves: **Moringa oleifera**
B., O. *Sajna sag;* G. *Saragavo;* H. *Saijan patta;* Kan. *Nugge yele;* Mal. *Muringa ela;* Mar. *Shevaga pan;* Tam. *Murungai keerai;* Tel. *Mulaga akulu;* Other names: Horse radish leaves, *Suha najna.*

78. Fenugreek leaves: **Trigonella foenum-graecum**
B., H., O. *Methi sag;* G., Kash., Mar. *Methi;* Kan. *Menthii na soppu;* Mal. *Uluva ila;* Tam. *Venthiya keerai;* Tel. *Menthkoora.*

79. Fetid cassia: **Cassia tora**
B., H. *Chakunda;* G. *Kovariya;* Mar. *Takla;* Tam. *Tagarai;* Tel. *Tantemu;* Other names: *Chakwar.*

81. Garden cress: **Lepidium sativum**
B., H., P. *Halim;* G. *Asalio;* Kan. *Allibija;* Mar. *Ahliva;* Tam. *Alivirai;* Tel. *Adityalu.*

82. Garden sorrel, sepals

83. Giria sag: **Suaeda nudiflora**
H. *Giria sag;* Mar. *Moras.*

84. Gogu: **Hibiscus cannabinus**
B. *Mestapat;* G., Mar. *Ambadi;* H. *Pitwa;* Kan. *Pundi;* O. *Nalite saga;* Tam. *Pulichai keerai;* Tel. *Gongura.*

85. Gulcharni: **Calonyction muricatum**
B., H. *Michai;* G. *Garayo;* Mar. *Bhonvari;* Tam. *Kathutali.*

86. Ipomoea leaves: **Ipomoea reptans**
B.H.*Kalmi sag,* Mar.*Nadishaka Nalani bhaji;* O. *Kandamula saga;* P. *Ganthian;* Tel. *Tutikoora.*

87. Kasini keerai: **Raphanus sp.**
Tam. *Kasini-keerai.*

88. Kalavan keerai
Tam. *Kalavan keerai.*

89. Karslanganni keerai
90. Mal. *Kannunni cheera;* Tam. *Karslanganni keerai.*

91. Katha sag: **Dentella repens**
H. *Katha sag;* Other names: Water fern.

92. Kena sag: **Commelina benghalensis**
B. *Dolopata;* H. *Kena sag;* Tel *Vennadevi koora.*

93. Khesari leaves: **Lathyrus sativus**
B., H., O. *Khesari sag;* Other names: *Lakkodi, Charal.*

94. Knol-khol greens: **Brassica oleracea var. caulorapa**
B. *Col sag;* H. *Ganth gobi-ka-sag;* Kash. *Monj hak;* P. *Gadh-gobee-da-sag.*

95. Koila karha sag: **Astercantha longifolia**
B. *Kuliakhara;* H., Mar. *Talmakhana;* Tam. *Nirmulli;* Tel. *Neerugubbi.*

96. Konar sag: **Bauhinia purpurea**
B., Mar. *Devakancham;* H. *Khairwal;* Tam. *Mandari;* Tel. *Kanchanam.*

97. Korla leaves: **Bauhinia malabarica**
Mar. *Korla.*

98. Koya keerai: **Amaranthus sp.**
Tam. *Koya keerai.*

99. Kuppa keerai: **Amaranthus viridis**
Tam. *Kuppa keerai.*

100. Kuppameni: **Acalypha indica**
B. *Mukthajhuri;* G. *Dadano;* H., Mar. *Kuppi khokli;* Kan. *Kuppigida;* Mal., Tam. *Kuppameni;* Tel. *Kuppichettu.*

101. Lettuce: **Lactuca sativa**
B. *Salad pata;* G. *Salat;* H. *Salad;* Kash. *Salaa'd;* Mal. *Uvar cheera.*

102. Lettuce tree leaves: **Pisonia alba**
103. Other names: *Chinai salit.*

104. Love-lies-bleeding: **Amaranthus caudatus**
B. *Nate sag;* G. *Chuko;* H. *Gendhri sag;* Tam. *Pungi keerai.*

105. Manal keerai: **Mullugo sp.**
Tam. *Manal keerai.*

106. Manathakkali leaves: **Solanum nigrum**
B. *Kakmachi;* G. *Piludi;* H. *Makoy;* Kan. *Ganika;* Mal., Tam. *Manathakkali;* Tel. *Kamanchi;* Other name: *Gurkhi.*

107. Mata sag: **Antidesma diandrum**

108. Mayalu: **Basella rubra**
B., H., Mar. *Poi;* Kan. *Basale;* Mal. *Basala;* Tam. *Sivappu salakkeerai;* Tel. *Erra bachchali;* Other name: Indian red spinach.

109. Minmini keerai
Tam. *Minmini keerai.*

110. Mint: **Mentha spicata**
B., H., Kan., Mal., Mar., P., Tam., Tel. *Pudina;* G. *Fudina;* Kash. *Pudynu;* O. *Podana patra.*

111. Modakathan keerai: **Cardiospermum helicacabum**
B. *Sibjhul;* G. *Karolis;* H. *Kanphuti;* Mar. *Kapat phodi;* Tam. *Modakathan keerai;* Tel. *Budda kakara.*

112. Mukarrate keerai: **Boerhaavia repens**
B., Tel. *Punarnava;* G. *Vakhakhapro;* H. *Sant;* Mar. *Tambadi vasu;* Tam. *Mukarrate keerai.*

113. Mustard leaves: **Brassica campestris var. sarason**
B. *Sorisa sag;* H. *Sarson-ka-sag;* Kan. *Sasuve yele;* Mal. *Kadugu ila;* Mar. *Mohari-chi pan,* P. *Sarson-da-sag;* Tam. *Kadugu ilai;* Tel. *Ava akulu.* Other name: *Sharisha*

114. Nachukottai keerai
Tam. *Nachukottai keerai.*

115. Neem leaves: **Azadirachta indica**
116. B. *Neem pata;* G. *Limdo limba;* H. *Neem-ke-patte;* Kan. *Bevu;* Mal. *Arya veppila;* Mar. *Kadu limb;* O. *Nima patra;* P. *Nim;* Tam. *Veppilai;* Tel. *Vepa akulu.*

117. Nerringi: **Tribulus terrestris**
B., H. *Gokhru;* Kan. *Negalu;* Mal. *Neringil;* Tam. *Nerringi;* Tel. *Palleru;* Other name: *Bhakra.*

118. Pacharisi keerai: **Euphorbia hirta**
H. *Dudhi;* Mal. *Nelapalai;* Tam. *Pacharisi keerai.*

119. Panna keerai: **Celosia sp.**
Tam. *Panna keerai.*

120. Parsley: **Petroselinum crispum**

121. Paruppu keerai: **Portulaca oleracea**
B. *Bara loniya;* H., P. *Kulfa;* Mar. *Ghol;* Tam. *Paruppu keerai;* Tel. *Pappu koora;* Other name: *Khursa.*

122. Parwar sag: **Trichosanthes dioica**
B. *Potol sag;* G. *Parwalne pan;* H. *Parwar sag;* Mar. *Paduwal;* Tam. *Kombuppodalai;* Tel. *Kommupotla.*

123. Pasarai keerai: **Portulaca sp.**
Tam. *Pasarai keerai.*

124. Patua sag: **Corchorus capsularis**

125. Ponnanganni: **Alternanthera sessilis**
B. *Khanchari;* H., *Saranti sag;* Kan. *Honagone soppu;* Mal., Tam. *Ponnanganni;* O. *Madarang;* Tel. *Ponnaganti koora;* Other name: *Khane hari.*

126. Potato leaves: **Solanum tuberosum**
B., H. *Alu sag;* Kan. *Alu yele;* Mal., Tam. *Urula kizhangu ilagal;* P. *Alu-de-patte;* Tam. *Alugadda akulu.*

127. Puliara keerai
Tam. *Puliara keerai.*

128. Pumpkin leaves: **Cucurbita maxima**
B., H. *Kumhra sag;* Kan. *Kumbale soppu;* Mal. *Mathan elakal;* Mar. *Bhopla-chi-pan;* P. *Sitaphal-de-patte;* Tam. *Parangi ilai;* Tel. *Gummadi akulu;* Other name: *Kaddu-ka-sag.*

129. Punnaku keerai: **Corchorus acutangulus**
Tam. *Punnaku keerai.*

130. Radish leaves: **Raphanus sativus**
B., H. *Mooli ka sag;* Kash. *Muji Lak;* Mal., Tam. *Mullangi; ilaigal;* Tel. *Mullangi akulu.*

131. Rajagira leaves: **Amaranthus paniculatus**
Tam. *Rajakeerai.*

132. Rape leaves: **Brassica napus**
133. B., O. *Sorisa sag;* G. *Sarsiyu;* H. *Sag sarsoon.*

134. Safflower leaves: **Carthamus tinctorius**
B., H. *Kusum sag;* G. *Kusumbna pan;* Kan. *Kusume yele;* Mal. *Kusumbha ilagal;* Mar. *Kardi pan;* Tam. *Sendurkam;* Tel. *Kusuma akulu.*

135. Saravallai keerai: **Trianthema monogyna**
B. *Lovet sabuni;* H. *Khapra sag;* Kan. *Muchchugoni;* Mar. *Pundhari ghentuli;* Tam. *Saravallai keerai;* Tel. *Galijeru;* Other name: Horse purslane.

136. Sarli sag: **Vangueria spinosa.**
137. B., H. *Muyuna;* Kan. *Mullakare;* Tam. *Munakkarai;* Tel. *Visikilamu;* Other name: *Atu.*

138. Seemai ponnanganni: **Alternanthera sp.**
Tam. *Seemai ponnanganni.*

139. Shepu: **Peucedanum graveolens.**
B., H. *Sowa;* G. *Suvani bhaji;* Kan. *Sabsige;* Mar. *Shepu;* Tam. *Sathakuppai;* Other name: *Surva.*

140. Sinduar sag: **Celosia argentia.**
B. *Swet murga;* H. *Safaid murga.*

141. Sinduar sag (wild): **Allmania polygonoides.**

142. Sirukeerai: **Amaranthus polygonoides**
Tam. *Sirukeerai.*

143. Sonchal sag: **Malva parviflora**
H. *Panirak;* Other name: *Supra.*

144. Spinach: **Spinacia oleracea**
B., O. *Palang sag;* G., H., Kash, Mar., P. *Palak;* Mal. *Basala cheera;* Tam. *Pasalai keerai;* Tel. *Bachchali koora.*

145. Soya leaves: **Glycine max**
B. *Gourikalai sag;* H. *Soya-ka-sag;* Mal. *Soya ilagal;* O. *Soya patra.*

146. Susni sag: **Marsilea minuta**
B. *Susni sag;* Kan. *Chitigina soppu;* Kash. *Paflu;* Tam. *Araikeerai;* Tel. *Chikilintha koora;*

147. Sweet potato greens: **Ipomoea batatas**
B. *Rangalu sag;* H., P. *Shakarkand sag;* Kan. *Genasina yele;* Mal. *Madhura kizhangu ilagal;* Tam. *Vallikizhangu ilai;* Tel. *Chilagadadumpa akulu.*

148. Table radish leaves: **Raphanus sativus**

See No. 130.

149. Tamarind leaves: **Tamarindus indicus**
150. B. *Tetul pata;* H., P. *Imli patte;* Kan. *Hunise chiguru;* Mal., Tam. *Puli ilaigal;* Mar. *Chinchecha pala;* Tel. *Chinta chiguru.*

151. Thooduvalai keerai: **Solanum sp.**
Tam. *Thooduvalai keerai.*

152. Thuthi keerai:
Tam. *Thuthi keerai.*

153. Turnip greens: **Brassica rapa**
H. *Shalgam-ka-sag.*

154. Utarba:

155. Vadhanarayanan keerai:
Tam. *Vadhanarayanan keerai.*

156. Veethi keerai: **Cadalia indica**
Tam. *Veethi keerai.*

157. Velai keerai: **Hydrolea sp.**
Tam. *Velai keerai.*

158. Vella keerai: **Cleome viscosa**
B. *Hurhuria;* G. *Talvani;* H. *Belaigori sag;* Kan. *Nayibela;* Mar. *Kamphuti;* Tam. *Vella keerai;* Tel. *Gominta.*

159. Vellari keerai:
Tam. *Vellari keerai.*

160. Water cress: **Nasturtium officinale**
G. *Asalia;* H. *Chandrasur;* Kan. *Alvi;* Mar. *Ahliv;* O. *Brahmi sag;* Tam. *Alli ilai.*

ROOTS AND TUBERS.

161. Arwa gadda.

162. Banana rhizome: **Musa paradisicum**
Mal., Tam. *Vazhai kizhangu;* Tel. *Arati dumpa.*

163. Beet root: **Beta vulgaris**
B., G., Kan., Mal., Mar., Tam., Tel. *Beet;* H., P. *Chukandar;* O. *Bita.*

164. Bokwa: **Dioscorea pentaphylla**
B. *Suar alu;* H. *Kanta alu;* Mar. *Ulassi;* Tam. *Kathu kizhangu;* Tel. *Dookapendalamu;* Other names: *Kulu, Tigo.*

165. Budhia: **Malothria heterophylla**
B. *Kudari;* H. *Anantmul;* Mal. *Njerinagan puli;* Mar. *Gometta;* O. *Karakla;* Tam. *Pulivanji;* Tel. *Thiyya donda.*

166. Canna, edible: **Canna edulis**

167. Carrot: **Daucus carota**
B., G., H., Mar., P. *Gajar;* Kan. *Gajjare;* Kash. *Gaazur;* O. *Gajara;* Tel. *Gajjara gadda.*

168. Chumbia: **Dioscorea hamiltonii**

169. Churkia: **Dioscorea glabra**
Other name: *Baiyang.*

170. Colocasia: **Colocasia antiquorum**
B. *Kochu;* G. *Alvi;* H., P. *Arwi;* Kan. *Sama gadde;* Mal. *Chembu;* Mar. *Alu kanda;* O. *Saru;* Tam. *Seppam kizhangu;* Tel. *Chama dumpa;* Other name: *Kachalu, Taro.*

171. Epedong sanga: **Peucedanum nagpurense**

172. Garmar: **Coleus barbatus**

173. Gotigadde:
Kan. *Gotigadde.*

174. Jipoo sanga: **Habenaria cammelinifolia**

175. Khamealu: **Dioscorea alata**
B., H. *Chupri alu;* Kan. *Onthala gasu;* Mal. *Kachil kizhangu;* Tam *Perumvalli kizhangu;* Tel. *Pendalamu.*

176. Lotus root: **Nelumbium nelumbo**
H. *Kamal-ki-jadh;* Kan. *Kamla dambu;* Kash. *Nadur;* Mal., Tam. *Thamara kizhangu;* Tel. *Thamara dumpa.*

177. Mango ginger: **Curcuma amada**
B. *Amada;* H. *Am haldi;* Kan. *Mavina hasisunthi;* Mal. *Manga inji;* Mar. *Amba haldi;* Tam. *Ma inji;* Tel. *Mamidi allam.*

178. Moor sanga: **Butea frondosa**

179. Murum sanga: **Dioscorea spinosa**

180. Nulu gadda

181. Ochen sanga: **Momordica cochinchinensis**

182. Onion: **Allium cepa**
183 B., H. *Pyaz;* G. *Kando;* Kan *Eerulli;* Kash. *Gandah;* Mal. *Ulli.* Mar. *Kanda;* O. *Piaja;* P. *Ganda;* Tam. *Vengayam;* Tel. *Neerulli.;*

184. Parsnip: **Pastinaca sativa**

185. Potato: **Solanum tuberosum**
B. *Gol alu;* G., Mar. *Batata;* H., O., P. *Alu;* Kan. *Alu gadda;.* Kash. *Oole;* Mal., Tam. *Urula kizhangu;* Tam. *Alu gaddalu*

186- Radish: **Raphanus sativus**
189. B., G., Mar., O. *Mula;* H., P. *Muli;* Kan., Mal., Tam., Tel. *Mullangi;* Kash. *Muj;* Other name: *Wuazu.*

190. Song: **Dioscorea anguiera**

191. Sweet potato: **Ipomoea batatas**
B. *Ranga alu;* G. *Sakkaria;* H. *Shakarkand;* Kan. *Genasu;* Mal., Tam. *Sakkaravalli kizhangu;* Mar. *Ratalu;* O. *Kandamula;* P. *Sakkarkamali;* Tel. *Chilagada dumpa.*

192. Tapioca: **Maninot esculenta**
193. B., H. *Simla alu;* Kan. *Mara genasu;* Mal. *Marachini;* O. *Kathakanda;* Tam. *Maravalli kizhangu;* Tel. *Karrapendalamu;* Other names: Cassava, *Kappa.*

194. Turnip: **Brassica rapa**
H. *Shalgam;* Kash. *Guagu'j.*

195. Turum sanga: **Curculigo orchioides**
B. *Talamuli;* H. *Kalimushi;* Tam. *Nilappanai kizhangu;* Tel. *Nelathati gadda.*

196. Usingid:

197. Yam, elephant: **Amorphophallus campanulatus**
B., *Ol;* G., Mar. *Suran;* H., P. *Zimi kand;* Kan. *Suvarna gadde* (*dodda*); Mal. *Chena* (*valuthu*); O. *Hathikhojia alu;* Tam. *Senai kizhangu;* Tel. *Kanda dumpa.*

198. Yam, ordinary: **Typhonium trilobatum**
Kan. *Suvarna gadde;* Mal. *Chena* (*sadharana*); Mar. *Goradu;* O. *Khamba alu;* Tam. *Karunai kizhangu.*

199. Yam, wild: **Dioscorea versicolor**
B. *Banalu;* H. *Suar alu;* Kan. *Heggenasu;* Mal. *Kattuchena;* Tam. *Kodikizhangu;* Tel. *Chedu paddu dumpa.*

200. Water lily: **Nymphea nouchali**
201. Tam. *Alli kizhangu*

OTHER VEGETABLES

202. Agathi-flowers: **Sesbania aegyptiaca**
H. *Agasth-ka-phool.*

203. Amaranth stem: **Amaranthus gangeticus**
B. *Nate danta;* H. *Cholai-ki-dandi;* Kan. *Dantu;* Mal. *Cherucheera thandu;* Mar. *Matha-chedeth;* O. *Khada;* Tam. *Keera. thandu;* Tel. *Thotakoora kadai*

204. Artichoke: **Cynara scolymus**
B., H. *Hathichak.*

205. Ash gourd: **Benincasa hispida**
B. *Chalkumra;* H., P. *Petha;* Kan. *Budagumbala;* Kash. *Mashaa'ly al;* Mal. *Kumbalanga;* Mar. *Kohala;* O. *Panikakharu;* Tam. *Poosini kai;* Tel. *Boodida gummadi.*

206. Bagnaha: **Capparis horrida**
B. *Kalokera;* H. *Ardanda;* Kan. *Tottulla;* Mar. *Govindi;* P. *Karvilla;* Tam. *Adondai;* Tel. *Adonda;* Other name: *Wag.*

207. Beans, scarlet runner: **Phaseolus coccineus**
H. *Sem;* Other names: *Sim, Uri.*

208, 209. Bitter gourd: **Momordica charantia**
B., G., H., Kash., P. *Karela;* Kan. *Hagal kai;* Mal. *Kaippakka;* Mar *Karle;* O. *Kalara;* Tam. *Pavakkai;* Tel. *Kakara kayi.*

210. Borooee, raw: **Gardenia gummifera**

211. Bottle gourd: **Lagenaria vulgaris**
B., O. *Lau;* G. *Dudhi;* H. *Lowki,* Kan. *Sorekai;* Kash. *Zeeth;* Mal. *Charanga;* Mar. *Pandhara bhopla;* P. *Ghia;* Tam. *Surai kai;* Tel. *Anapakaya;* Other names: Calabash cucumber, *Kaddu.*

212. Brinjal: **Solanum melongena**
B. *Begun;* G. *Ringna;* H. *Baingan;* Kan. *Badane;* Kash. *Waangum;* Mal. *Vazhuthininga;* Mar. *Vange;* O. *Baigan;* P. *Bataun;* Tam. *Kathiri;* Tel. *Vankaya;* Other name: Egg plant.

213. Broad beans: **Vicia faba**
B. *Makhan sim;* G. *Fafda papdi;* H. *Bakla;* Kan. *Chapparadavare;* Mal. *Avarakka;* O. *Simba;* Tam. *Avarai;* Tel. *Pedda chikkudu.*

214. Cauliflower: **Brassica oleracea, var. botrytis**
B., G., H., Kash., Mar., O., P. *Phul gobi;* Kan. *Hukosu;* Tam. *Kovippu;* Other name: *Olkapi.*

215. Celery stalks: **Apium graveolens, var. dulce**
B. *Randhuni;* H. *Ajmud.*

216. Chaltha: **Dillania indica**
G., Mar. *Karambel;* Other name: *Uva.*

217. Cho-cho-marrow: **Sechium edule**
Kan. *Seeme badane;* O. *Phuti kakudi;* Tam. *Seemai kathirikai;* Tel. *Seema vankayi.*

218. Cluster beans: **Cyamopsis tetragonoloba**
B. *Jhar sim;* G. *Govar;* H. *Guar-ki-phalli;* Kan. *Gori kayi; Guar-ki-phalli;* Mal., Tam. *Kothavara;* Mar. *Govari;* O. *Guanra chhuin;* P. *Guara-di-phalli;* Tel. *Goruchikkudu.*

219. Colocasia stem: **Colocasia antiquorum**
B. *Kochu danta;* H. *Arwi-ki-dandi;* Kan. *Kesu dantu;* Mal. *Chembin thandu;* Mar. *Alu-che-deth;* O. *Sarunada;* Tam. *Seppanthandu;* Tel. *Chama kada.*

220. Cow pea pods: **Vigna catjang**
See No. 35.

221. Cucumber: **Cucumis sativus**
B. *Sasha;* G. *Kakdi;* H.P. *Khira;* Kan. *Soutshe kayi;* Kash. *Laa'r;* Mal. *Vellarikka;* Mar. *Kakadi,* O. *Kakudi;* Tam *Kakkarikkai;* Tel. *Dosa kayi.*

222. Double beans: **Faba vulgaris**
G. *Papdi;* H. *Chastang;* Mal *Avara.*

223. Drumstick: **Moringa oleifera**
B. *Sajna danta;* G. *Saragavo;* H *Saijan-ki-phalli;* Kan. *Nugge kayi;* Mal., Tam. *Muringakkai* Mar. *Shevaga sheng;* O. *Sajan chhuin;* Tel. *Mulaga kada;* Othe name: Horse radish.

224. Drumstick flowers: **Moringa oleifera**

225. Field beans, tender: **Dolichos lablat**
See No. 36.

226. Figs: **Ficus cunia**
B. *Dumur;* H., Mar. *Anjeer;* Mal., Tam., Tel. *Athikai.*

227. French beans: **Phaseolus vulgaris**
G. *Fansi;* H. *Bakla;* Kan. *Huruli kayi;* Kash. *Fraa'sh bean;* Mar. *Pharasbee;* P. *Fras bean.*

228. Ghosala: **Luffa cylindrica**
Mar. *Gohosala;* P. *Ghia tori;* Tel *Guthi beera.*

229. Giant chillies (Capsicum): **Capsicum annuum** var. **grossa**
B. *Lanka* (*bilathi*); H. *Sagiya mirchi;* Kash. *Marchawangum;* Mal. *Unda mulagu;* Mar. *Bhopli mirch;* P. *Shimle-di-mirch;* Tam. *Koda milagai.*

230. Ipomoea stems: **Ipomoea reptans**
B. *Kolmi danta;* Mar. *Nalichi bhaji;* O. *Kandamula danka.*

231. Jack, tender: **Artocarpus heterophyllus**
B. *Aanchar;* G. *Kawla phanas;* H. *Kathal;* Kan. *Halasu* (*yele*); Mal. *Idichakka;* Mar. *Phanas;* O. *Panasa katha;* Tam. *Pila pinju;* Tel. *Panasa.*

232. Kanthan kathiri: **Solanum xanthocarpum**
G. *Bhony ringni;* H. *Kateli;* Mal., Tam. *Kandan Kathiri;* O. *Bheji baigana;* Tel. *Vakudu mulaga.*

233. Kankoda: **Momordica dioica**
H. *Golkandra;* Mal. *Erimapasal;* Tam. *Paluppakkai;* Tel. *Akakara;* Other name: *Karantoli.*

234, Karonda: **Carissa carandas**
235. H. *Karonda.*

236. Kheksa: **Momordica cochinchinensis**
G. *Karapata;* H. *Kheksa;* Other names: *Kakrol, Bhat karela.*

237. Kovai: **Coccinia cordifolia**
B. *Telakuchu;* G. *Ghole gluru;* H. *Konduri;* Kan. *Tondekayi;* Mal., Tam. *Kova kai;* Mar. *Tondale;* O. *Kunduru;* Tel. *Donda kayi.*

238. Knol-khol: **Brassica oleracea,** var. **caulorapa**
B. *Olkopi;* G., Mar. *Nol-kol;* H. *Kohl-rabi;* Kash. *Mo'nd;* O. *Ulkobi;* P. *Ganth gobi.*

239. Ladies fingers: **Abelmoschus esculentus**
B. *Dherash;* G. *Bhinda;* H., P. *Bhindi;* Kan. *Bende;* Kash *Bindu';* Mal., Tam. *Vendakkai;* Mar., O. *Bhendi;* Tel. *Benda kayi;* Other name: *Okra.*

240. Lakooch, raw: **Artocarpus lakoocha**
H. *Barhar* (*kacha*); Kan. *Vatchuli;* Mar. *Wotomba;* Tel. *Kamma regu.*

241. Leeks: **Allium porrum**
B. *Piyaj* (*bilati*); H. *Lasson* (*vilayiti*); Kash. *Praan;* Mar. *Khorat;* O. *Rasuna* (*bilati*).

242. Lotus stem: **Nelumbium nelumbo**
H. *Kamal gatta;* Mal., Tam. *Thamara thandu;* Tel. *Thamara kada.*

243. Mango green: **Mangifera indica**
B. *Am* (*kancha*); G., *Ambo;* H. *Am;* Kan. *Mavinakayi;* Mal., Tam. *Manga;* Mar. *Amba;* O. *Ambu* (*kancha*); P. *Am* (*hare*); Tel. *Mamidi kayi.*

244, Mogra
245.

246. Nisorha flowers: **Cardia dichotoma**
B. *Bahubara;* H. *Losora;* Kan. *Chikka challe;* Mal. *Cheruviri;* Tam. *Natuvili;* Tel. *Chinna nakkeru.*

247. Onion stalks: **Allium cepa**
B. *Piyaz kali;* G. *Dunglina dakkadi;* H. *Pyaz;* Kan. *Eerulli soppu;* Mal. *Ulli thandu;* Mar.

Pati; O. *Piaja sandha;* Tam. *Vengaya thandu;* Tel. *Ulli kadalu.*

248. Papaya, green: **Carica papaya**

B. *Pempe (kancha);* G. *Papayi;* H. *Papita;* Mar. *Papaya;* Kan. *Parangi;* Mal. *Omakaya;* P. *Katcha pepita;* Tam. *Pappali kai;* Tel. *Boppayi kayi.*

249. Parwar: **Trichosanthes dioica**

B. *Patol;* G. *Padval;* H. *Parwal;* Mal. *Potalam;* Mar. *Parwar;* O. *Potala;* Tel. *Kommu potla.*

250. Peas: **Pisum sativum**

B., H., Kash., P. *Matar;* G., Mar. *Vatana;* Kan., Tel. *Batani;* Mal., Tam. *Pattani;* O. *Matara.*

251. Pink beans: **Phaseolus** sp.

B. *Lal sim;* G. *Valore;* H. *Babril;* Kan. *Kempu huruli;* Mal. *Chuvana avara;* O. *Nali simba.*

252. Plantain flower: **Musa sapientum**

B. *Mocha;* G., Mar. *Kel phool;* H. *Kele-ka-phool;* Kan. *Bale motho;* Mal., Tam. *Vazhapoo;* O. *Kadali bhanda;* P. *Kele-da-phool;* Tel. *Arati puvvu.*

253. Plantain, green: **Musa sapientum**

B. *Kela (kanch);* G. *Kela;* H., P. *Kela (hara);* Kan. *Bale kayi;* Mal., Tam. *Vazhakkai;* Mar. *Kele;* O. *Bantala kadali;* Tel. *Arati kayi.*

254. Plantain stem: **Musa sapientum**

B. *Thor;* G. *Kelanu thed;* H. *Kele-ka-tana;* Kan. *Dindu;* Mal. *Unnipindi;* Mar. *Kelicha khunt;* O. *Kadali manja;* Tam. *Vazhai thandu;* Tel. *Arati doota.*

255. Pumpkin: **Cucurbita maxima**

B. *Kumra;* G. *Kohiu;* H. *Kaddu;* Kan. *Kumbala;* Kash. *Paa'rimal;* Mal. *Mathan;* Mar. *Lal bhopla,* O. *Kakharu;* P. *Sitaphal;* Tam. *Parangikkai;* Tel. *Gummadi kayi.*

256. Pumpkin flowers: **Cucurbita maxima**

257. Rape plant stem: **Brassica napus**

B. *Sorisa danta;* G. *Rainu zad;* H. *Sarson-ki-dandi;* O. *Sorisa nada.*

258. Red gram, tender: **Cajanus cajan**

259. Rhubarb stalks: **Rheum emodi**

B. *Reuchini danta;* H. *Revand chini;* Mal. *Variyath thandu.*

260. Ridge gourd: **Luffa acutangula**

B. *Jhinga;* G. *Turia;* H. *Torai;* Kan. *Heeraikai;* Kash. *Turrel;* Mal. *Peechinga;* Mar. *Dodka;* O. *Janchi;* P. *Kali tori;* Tam. *Pirkkankai;* Tel. *Beera kayi.*

261. Sanga-ka-phal: **Dioscorea puber**

262. Sannhemp flowers: **Crotalaria juncea**

B. *Shon;* H. *Sanai-ka-phool;* Kan. *Sanalu;* Mal. *Wucka poo;* Mar. *Tag;* Tam. *Sannappu sanal;* Tel. *Janumu puvvu.*

263. Silk-cotton flowers: **Bombax malabaricum**

H. *Semal-ka-phool;* Kan. *Reshme-hattine huvu;* Mal. *Poola poo;* Tam. *Ilavam puvu;* Tel. *Boorugu puvvulu.*

264. Snake gourd: **Trichosanthes anguina**

B. *Chichinga;* G. *Pandola;* H., O. *Chachinda;* Kan. *Padavala;* Mal. *Padavalanga;* Mar. *Padwal;* Tam. *Podalangai;* Tel. *Potla kayi.*

265. Spinach stalks: **Spinacia oleracea**

B. *Palong danta;* H., P. *Palak-ki-dandi;* Mal. *Vasalicheera thandu;* Mar. *Palak deth;* O. *Palanga nada;* Tam. *Pasalai thandu;* Tel. *Bacchala kada.*

266. Sundakai: **Solanum torvum**

B. *Titbaigum;* Kan. *Sondekai;* Mal. *Sundakka;* Tam. *Sundakkai;* Tel. *Usthi kayi.*

267. Sword beans: **Canavalia gladiata**
B. *Kath sim;* G. *Taravardini vel;* H. *Bara sem;* Kan. *Tumbekai;* Mal. *Val avava;* Mar. *Abaichi sheng;* O. *Maharda;* Tam. *Kathu thambattam;* Tel. *Adavi thamma;* Other name: *Makhan sim.*

268. Tetrolobar bean: **Lotus tetragonolobus**
H. *Hatna-sirmi;* Other name: Winged pea.

269. Tinda: **Citrullus vulgaris**
G. *Tadabuch;* H. *Tinda;* Other name: Round gourd.

270. Tomato, green: **Lycopersicon esculentum**
B. *Bilathi bagun;* Kash. *Ruwangan;* Mal., Tam. *Thakkali;* Other names: Love apple.

271. Vegetable marrow: **Cucurbita pepo**
B. *Dhudul;* H. *Safed kaddu;* Kan. *Dilpasand;* Kash. *Kaa'shir al;* Mar. *Kashi bhopla;* O. *Golu phuti kakuri;* Other name: Field pumpkin.

272, Water chestnut: **Trapa bispinosa**
273. B. *Pani phal;* G. *Shingoda;* H., Mar. *Shingara;* O. *Pani singhara;* Tel. *Kubyakam.*

274. Water lily flowers: **Nymphaea nouchali**
G. *Nilopal;* H. *Bhent-ka-phool;* Mal. *Vellambal poo;* Tam. *Allithamara;* Tel. *Tella kaluva.*

NUTS & OILSEEDS

275. Almond: **Prunus amygdalus**
B., G., H., Kan., Kash., Mal., Mar., O., P., Tam., Tel. *Badam.*

276. Cashew nut: **Anacardium occidentale**
B. *Hijli badam;* G., H., Kash., Mar., P., *Kaju;* Kan. *Geru beeja;* Mal. *Kasu andi;* O. *Lanka ambu manji;* Tam. *Mundiri paruppu;* Tel. *Jeedi pappu.*

277. Chilgoza: **Pinus gerardiana**
H. *Chilgoza;* P. *Rhi.*

278, Coconut: **Cocos nucifera**
279. B. *Narkel;* G., H. *Nariyal;* Kan. *Thengini kai;* Kash. *Narjeel;* Mal., Tam. *Thenga;* Mar. *Naral;* O. *Nadia;* P. *Gola;* Tel. *Kobbari.*

280. Garden cress seeds: **Lepidium sativum**
See No. 81.

281. Gingelly seeds: **Sesamum indicum**
B., H., Mar., P. *Til;* G., *Taj* Kan. *Acchellu;* Mal., Tam., *Ellu;* O. *Rasi;* Tel. *Nuvvulu;* Other name: Sesame seeds.

282, Groundnut: **Arachis hypogaea**
283. B., O. *China badam;* G. *Bhoising;* H., Kash., P. *Moong phali;* Kan. *Kadale kayi;* Mal., Tam. *Nilakkadalai;* Mar. *Bhui mug;* Tel. *Verusanaga.*

284. Jungli badam: **Sterculia foetida**
Tel. *Yenuga badam.*

285. Linseed seeds: **Linum usitatissimum**
B. *Tishi;* G., H., P. *Alsi;* Kash. *A'lish;* Mal. *Cheruchana vithu;* Mar. *Jawas;* O. *Pesi;* Tam. *Ali vidai;* Tel. *Avise ginzalu.*

286. Mustard seeds: **Brassica nigra**
B. *Sorse;* G., H., P. *Rai;* Kan. *Sasuve;* Kash. *Aasur;* Mal., Tam. *Kadugu;* Mar. *Mohori;* O. *Sorisa;* Tel. *Avalu.*

287. Niger seeds: **Guizotia abyssinica**
B. *Ram til;* H. *Kala til;* Kan. *Gurellu;* Mar. *Karale;* Tam. *Kattelu;* Tel. *Valasulu;* Other name: *Surguja.*

288. Oyster nut: **Telfairea pedata**

289. Pistachio nut: **Pistacia vera**
B. *Pesta;* G., H., Kan., Mal., Mar., O., P., Tam., Tel. *Pista;* Kash. *Jalguza.*

290. Piyal seeds: **Buchanania latifolia**
G., Mar. *Charoli;* H., B. *Piyal;* Kan. *Narkal;* Tam. *Sarai paruppu;* Tel. *Sarapappu;* Other name: *Chironji.*

291. Safflower seeds: **Carthamus tinctorius**
H. *Kardi;* Tel. *Kusuma ginzalu;* Other name: Kusumbh seeds.

292. Sunflower seeds: **Helianthus annuus**
B., P. *Suraj mukhi;* H., Mar. *Surya mukhi;* Mal., Tam. *Suryakanthi;* Tel. *Podduthirugudu puvvu ginzalu.*

293. Walnut: **Juglans regia**
B., G., H., P. *Akhrot;* Mar. *Akhrod;* O. *Akhoot.*

CONDIMENTS AND SPICES

294. Arisithippili:
B. *Pipul;* H. *Peepal;* Mal., Tam. *Arisithippili;* O. *Sarupipali.*

295. Asafoetida: **Ferula foetida**
B., G., H., Mar., P. *Hing;* Kan., O. *Hingu;* Kash. *Yangu';* Mal., Tam. *Perungayam;* Tel. *Inguva.*

296. Cardamom: **Elettaria cardamomum**
B. *Elachi;* G., H., P. *Elaychi;* Kan. *Yelakki;* Kash. *Aa'l Budu'a aa'l;* Mal. *Elathari;* Mar. *Veldoda;* O. *Alaichi;* Tam., Tel. *Elakkai.*

297, Chillies: **Capsicum annuum**
298. B., O. *Lanka;* G. *Marcha;* H. *Mirch;* Kan. *Menasina kayi;* Kash. *March wangun;* Mar. *Mirchi;* Mal. *Mulaku;* P. *Mirchan;* Tam. *Milagai;* Tel. *Mirapa kayi.*

299, Cloves: **Syzygium aromaticum**
300. B.,O.*Labang;* G., H., Mar. *Lavang;* Kan. *Lavanga;* Kash. *Ruang;* Mal., Tam. *Krambu;* P. *Long;* Tel. *Lavangalu.*

301. Coriander: **Coriandrum sativum**
B., G., H., O., P. *Dhania;* Kan. *Kothambari;* Kash. *Daaniwal;* Mal. *Kothambalari;* Mar. *Dhane;* Tam. *Kothamalli vidai;* Tel. *Dhaniyalu.*

302. Cumin seeds: **Cuminum cyminum**
B., H., Mar., O., P., *Jira;* G. *Jiru;* Kan. *Jeerage;* Kash. *Zyur;* Mal., Tam. *Jeerakam;* Tel. *Jeelakarra.*

303. Fenugreek seeds: **Trigonella foenum graecum**
B., G., H., Mar., O. *Methi;* Kan. *Menthe;* Kash. *Meeth;* Mal. *Uluva;* P. *Meth;* Tam. *Venthayam;* Tel. *Menthulu.*

304. Garlic: **Allium sativum**
B. *Rashun;* G., P. *Lasan;* H. *Lehsan;* Kan. *Bellulli;* Kash. *Ruhan;* Mal., Tel. *Vellulli;* Mar. *Lasoon;* O. *Rasuna;* Tam. *Ullipoondu.*

305. Ginger, fresh: **Zinziber officinale**
B., O. *Ada;* G. *Adu;* H., P. *Adrak;* Kan. *Shunti;* Mal., Tam. *Inji;* Mar. *Ale;* Tel. *Allam.*

306. Kandanthippili: **Piper longum**
Mal., Tam. *Kandanthippili;* O *Pipali.*

307. Lime peel: **Citrus medica var. acida**
B. *Lebur khosa;* G. *Limbuni chal;* H. *Neebu ka chilka;* Kan. *Nimbe sippai,* Mal. *Cherunaranga tholu;* Mar. *Limbsal;* O. *Lembri chopa;* Tam. *Elumicham thol;* Tel *Nimma thokku.*

308. Mace: **Myristica fragrans**
B., O. *Jayitri;* G., Mar. *Jaypatri;* H. *Javithri;* Kash. *Jalwatur';* Mal., Tam. *Jathipatri;* Tel. *Japathri.*

309. Nutmeg: **Myristica fragrans**
B., G., H., Mar., O. *Jaiphal;* Kan., Tel. *Jaji kayi;* Kash. *Zaaphal;* Mal., Tam. *Jathikkai.*

310. Nutmeg rind: **Myristica fragrans**

311. Omum: **Trachyspermum ammi**
B. *Joan;* H., P. *Ajwan;* Kan. *Oma;* Kash. *Jaaweni;* Mal. *Ayamothakam* · Mar. *Onva;* O. *Juani;* Tam. *Omum;* Tel. *Vamu;* Other name: *Jurani.*

312,. Pepper: **Piper nigrum**
313 B., O. *Golmarich;* G. *Mari;* H., P. *Kalimirch;* Kan. *Kari menasu;* Kash. *Marutus;* Mal. *Kurumulaku;* Mar., *Mire;* Tam. *Milagu;* Tel. *Miriyalu.*

314. Tamarind pulp: **Tamarindus indica**
B. *Tetul;* G. *Amli;* H., P. *Imli;* Kan. *Hunise hannu;* Kash. *Tamber;* Mal., Tam. *Puli;* Mar. *Chinch;* O. *Tentuli;* Tel. *Chintha pandu.*

315. Turmeric: **Curcuma domestica**
B. *Holud;* G. *Haldhar;* H., P. *Haldi;* Kan. *Anashina;* Kash. *Lader;* Mal., Tam. *Manjal;* Mar. *Halad;* O. *Haladi;* Tel. *Pasupu.*

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316. Ambada: **Spondias mangifera**
B., H. *Amra;* Kan. *Ambate;* Mal. *Mampuli;* Tam. *Mambulichi;* Tel. *Amratakamu;* Other name: Indian hog plum.

317. Amla: **Emblica officinalis**
B. *Amlaki;* G., H. *Amla;* Kan., Mal., Tam. *Nellikai;* Mar. *Anvla;* O. *Anla;* Tel. *Usirikayi;* Other name: Indian gooseberry.

318. Apple: **Malus sylvestris**
G. *Safarjan;* H., O. *Sev;* Kan. *Sebu;* Kash. *Tsoonth;* Mar. *Safar chand;* Other name: *Tarel.*

319, Apricot: **Prunus armeniaca**
320. H. *Khoomani;* Kash. *Tser;* Other name: *Khubani.*

321. Avacado pear: **Persea americana**
B. *Kulunashpati;* Kash. *Goshtub tang;* Other name: Butter fruit.

322. Bael fruit: **Aegle marmelos**
B., H., Mar. *Bel;* G. *Bil;* Tam. *Bilwa pazham;* Tel. *Maredu pandu.*

323. Baincha: **Flacourtia indica**
B. *Bincha;* H. *Bilangra;* Mar.. *Kaker;* Tam. *Sottai kala;* Tel. *Putikatada;* Other names: *Baichi,* Batoko plum.

324. Bamboo fruit: **Bambusa arundinacea**
B. *Banser phal.*

325. Banana, ripe: **Musa paradisiaca**
B. *Kala (paka);* G., H., Kash. *Kela;* Kan. *Bale hannu;* Mal., Tam. *Vazha pazham;* Mar. *Kele;* O. *Champa kadali;* P. *Kella;* Tel. *Arati pandu.*

326. Banyan tree figs: **Ficus bengalensis**
H. *Bargad-ka-phal;* . Mal., Tam. *Alam pazham;* Tel. *Marri pandu.*

327. Bilimbi: **Averrhoa bilimbi**
B. *Kamranga;* Kan. *Kamaleku;* O. *Karamanga.*

328. Blackberry: **Rubus fruiticosus**
H. *Vilaiti-anchu;* P. *Alish;* Other name: Bramble.

329. Borooee: **Gardenia gummifera**
H. *Dikamli;* Tam. *Dikka malli;* Tel. *Karingua.*

330. Bread fruit: **Artocarpus altilis**
B., H. *Madar;* Mal. *Kadachakka.*

331. Bullock's heart: **Annona reticulata.**
B. *Nona;* G., Mar. *Ramphal;* H. *Nona atwa;* Kan., Tel. *Ramaphala;* Mal. *Athachakka;* O. *Raja amba;* Tam. *Ramsita pazham.*

332. Cape gooseberry: **Physalis peruviana**
B. *Tepari;* G. *Popta;* H., P. *Rasbari;* Mal. *Kodinellikkai;* Mar. *Tipari.*

333. Carambola: **Averrhoa carambola**
H. *Kamrakh.*

334. Cashew fruit: **Anacardium occidentale**
B. *Hijli badam;* G., H., Mar., P. *Kaju phal;* Kan. *Geru hannu;* Mal. *Kasu manga;* O. *Lanka amba;* Tam. *Mundiri pazham;* Tel. *Jeedi pandu.*

335. Cherries, red: **Prunus cerasus**
H., Kash., P. *Gilas.*

336. Cherimoyer: **Annona cherimolia**
H. *Hanuman phal.*

337. Currants, black
H. *Munakka.*

338, Dates: **Phoenix dactylifera**
339 B. *Khejur;* G., H., Mar., P. *Khajur;* Kan. *Kharjoora;* Kash. *Kha'zur;* Mal. *Eethapazham;* O. *Khajuri;* Tam. *Pericham pazham;* Tel. *Kharjoora pandu.*

340. Durian: **Durio zibethinus**
Mal. *Durian pazham*

341. Figs: **Ficus carica**
B. *Dumoor;* G., H., Kash., Mar., P. *Anjeer;* Kan. *Anjura;* Mal., Tam. *Atti pazham;* O. *Dimiri;* Tel. *Athi pallu;* Other name: *Gullar.*

342. Gab: **Diospyros embryopteris**
B., H. *Gab;* Mal. *Panachi;* Tam. *Tumbi;* Tel. *Tinduki.*

343, Grape: **Vitis vinifera**
344. B., H., P., O. *Angoor;* G., Kan., Mar., Tam., Tel. *Draksha;* Kash, *Da'ch;* Mal. *Mundiringa.*

345, Grapefruit: **Citrus paradisi**
346. B. *Bilati batabi Jambura);* G., H. *Chakotra;* Kash., Mar., *Be' daana;* Mal. *Mundri pazham;* O. *fBada angur.*

347. Guava, country: **Psidium guajava**
B. *Payra (deshi);* G. *fJam phal;* H., P. *Amrud;* Kan. *Seebe;* Mal. *Perakka (nattu):* Mar. *Peru;* O. *Pijuli (deshi);* Tam. *Koya pazham;* Tel. *Jami pandu.*

348. Guava, hill: **Psidium cattleyanum**

349 Harfarowrie: **Phyllanthus distichus**
B. *Hari phal;* Kan., Mal., Tam. *Aranelli;* Mar. *Rai avala;* Tel. *Racha usiri kayi;* Other name: Star gooseberry.

350. Hoorned: **Ericybe paniculata**

351. Jack fruit: **Artocarpus heterophyllus**
B. *Kanthal;* G., Mar. *Phanas;* H., P. *Kathal;* Kan. *Halasu;* Mal. *Chakka;* O., Tel. *Panasa;* Tam. *Pala pazham.*

352. Jam, safed: **Eugenia malaccensis**
353. Jambu fruit: **Syzygium cumini**
B. *Kalojam;* G. *Jambu;* H., P. *Jamun;* Kan. *Neralai;* Mal., Tam. *Naga pazham;* Mar. *Jambhool;* O. *Jamukoli;* Tel. *Neredu pandu.*

354. Jurmata: **Canthium didymum**

355. Kesaur: **Pachyrrhizus angulatus**
H. *Sakalu.*

356. Kila pazham: **Vaccinium leschenaultii**
H. *Karaunda,* Mal., Tam., *Kila pazham;* Tel. *Wakkai.*

357. Korukkapalli: **Pithacellobium dulce**
B. *Tetul (bilati);* G. *Amli goras;* H. *Singhri;* Kan. *Seema hunise;* Mal., Tam. *Korukkapalli;* Mar. *Chinch (vilaythi);* Tel. *Seema chinta* Other name: Manila imli.

358. Kusum fruits; **Schleichera trijuga**
H. *Kusum-ka-phal.*

359. Lakuch: **Artocarpus lakoocha**
B. *Dephal dahua;* H. *Barhar;* Kan. *Vote huli;* Mar. *Wotombe;* Tam. *Ilagusam;* Tel. *Kamma regu.*

360. Langsat: **Lansium domesticum**

361. Lemon: **Citrus limon**
B. *Pati lebu;* G. *Motu limbu;* H. *Bara nimbu;* Kash. *Nyomb;*

Mal. *Poo naranga;* Mar. *Limbu;* O. *Kagaji lembu.*

362. Lemon, sweet: **Citrus limetta**
B. *Mitha lebu;* G. *Mitha limbu;* H. *Mitha neebu;* Kan. *Gaja nimbe;* Tam. *Kolinchi pazham;* Tel. *Gaja nimma pandu.*

363. Lichi: **Nephelium litchi**
H. *Lichi*

364. Lichi, bastard: **Nephelium longana**
H. *Ansfal.*

365. Lime: **Citrus aurantifolia**
B. *Lebu;* G. *Kadgi limbu;* H. *Neembu;* Kan. *Nimbe;* Kash. *Nyomb;* Mal. *Cherunaranga;* Mar. *Musumbe;* O. *Gangakulia lembu;* P. *Nimbha;* Tam. *Elumichai;* Tel. *Nimma pandu.*

366. Lime, sweet, Malta.

367. Lime, sweet, Musammi: **Citrus sinensis**
H. *Musambi.*

368. Loquat: **Eriobotrya japonica**
H., Kash., Tel. *Lokat;* Kan. *Laquot;* Mal., Tam. *Lakot pazham;* Mar. *Lukat;* Other name: Japan plum.

369. Mahua, ripe: **Bassia longifolia**
B., G., H., Mar. *Mahua;* Kan. *Hippe;* Mal. *Poonamilupa;* O. *Mahula;* Tam. *Iluppai;* Tel. *Ippa.*

370. Mango, ripe: **Mangifera indica**
B., H. *Aam (paka);* G. *Keri;* Kan. *Mavina hannu;* Kash., P. *Amb;* Mal., Tam. *Mam pazham;* Mar. *Amba (piklela);* O. *Amba (pachila);* Tel. *Mamidi pandu.*

371. Mangosteen: **Garcinia mangostana**
Kan., Tam. *Mangusthan.*

372, Matasura: **Antidesma ghesaembilla**
373.

374. Melon, musk: **Cucumis melo**
B. *Kharmuj;* G., H., Mar., P., Tel. *Kharbooja;* Kash. *Kherbuz;* Tam. *Mulam pazham;* Other name: Cantaloup.

375. Melon, water: **Citrullus vulgaris**
B. *Tarmuj;* G., H. *Tarbuj;* Kan. *Kallangadi;* Kash. *He'nd wend;* Mal. *Thannir mathan;* Mar. *Kalingad;* O. *Tarvuja;* P. *Tarbuja;* Tam. *Darbusini;* Tel. *Puchakayi.*

376. Mulberry: **Morus sp.**
H. *Shahtoot;* Kash. *Tul;* Tam. *Musukkottai puzham.*

377. Mulchari: **Minusops elengi**
H. *Bakul;* Tam. *Magilam;* Tel. *Vakulamu.*

378. Neem fruit: **Malia azadirachta**
B. *Neem phal;* Mal., Tam. *Veppam pazham;* Tel. *Vapa pandu.*

379. Nisorha: **Cordia dichotoma**
B. *Bahubara;* H. *Lasora;* Kan. *Chikka chalk;* Mal. *Cheruviri;* Mar. *Shelvant;* Tam. *Narvalli;* Tel. *Chinna nakkeru.*

380, Orange: **Citrus aurantium**
381. B. *Kamala lebu;* G., P. *Santra;* H. *Narangi;* Kan. *Kithilai;* Kash. *Sangtar;* Mar. *Madhura naranga;* Mar. *Santre;* O. *Kamala;* Tam. *Kichili pazham;* Tel. *Kamala pandu.*

382, Palmyra fruit: **Borassus flabellifer**
383. B. *Tal shash;* G., *Tal;* H., *Tar;* Kan. *Thati nungu;* Mal. *Panam nungu;* Mar. *Shindi shirani;* O. *Tala;* Tam. *Panai nungu;* Tel. *Thati pandu.*

384. Paniyala: **Flacourtia cataphracta**
B. *Paniyala;* H. *Talis-patri.*

385. Papa: **Gardenia latifolia.**

386. Papaya, ripe: **Carica papaya**
B. *Pepe (paka);* G. *Papaya;* H., P. *Papita;* Kan. *Pharangi;* Mal. Omakai; Mar. *Popai;* O *Amrut bhanda (pachila);* Tam. *Pappali;* Tel. *Boppayi pandu.*

387, Passion fruit: **Passiflora edulis**
388. G. *Krishna kamal;* Mal. *Kireeda poochad pazham.*

389. Peaches: **Amygdalis persica**
H., P. *Aarhoo;* Kan. *Marasebu;* Kash. *Tsun'un;* O. *Piccuu;* Other name: *Satalu.*

390. Pears: **Prunus persica**
B., G., H., Mar., O., P. *Nashpati;* Kan., Tam., Tel. *Berikai;* Kash. *Tang;* Mal. *Sabarjil;* Other name: *Goshbub.*

391. Perar: **Randia uliginosa**

392. Persimmon: **Diospyros kaki**
B. *Gav;* Other name: *Kaki.*

393. Phalsa: **Grewia asiatica.**
H., P. *Falsa.*

394. Pine apple: **Ananas comosus**
B. *Anarash;* G., H., Kan., Mar P. *Ananas;* Mal. *Kayitha chakka;* O. *Sapuri Anasianas;* Tam. *Anasi pazham;* Tel. *Anasa pandu.*

395. Pipal tree figs: **Ficus religiosa**
H. *Pipar-ka-pakua*; Tam. *Arasam pazham;* Tel. *Ravi Pandu.*

396. Piyal: **Buchanania latifolia**

397. Plum: **Prunus domestica**
H. *Alubokhara;* Kash. *Laar;* P. *Aladu;* Tam., Tel. *Alpagoda.*

398. Pomegranate: **Punica granatum**
B. *Dalim;* G. *Dalamb;* H., P. *Anar;* Kan. *Dalimbari;* Kash. *Daa'n;* Mal., Tam. *Mathalam pazham;* Mar. *Dalimb;* O. *Dalimba;* Tel. *Danimma pandu.*

399. Prunes: **Prunus salicina**

400. Pummelo: **Citrus maxima**
B. *Batabi lebu;* G., Mar. *Papnus;* H. *Chakotra;* Kan. *Chakkota;* Mal., Tam. *Bombilimas;* O. *Batapi lembu;* Tel. *Pampara nanasa;* Other name: Shaddock.

401. Quince: **Cydonia oblonga**
B. *Bael (bilati);* H. *Bihi;* Kan. *Seema dalimbe;* Kash. *Bamt soonth;* Tam. *Seemai madalai;* Tel. *Seema danimma.*

402. Raisins: **Vitis vinifera**
B., G., H., Kash., O. P., Tel. *Kishmish;* Kan. *Drakshi;* Mal. *Mundiringa (unakku);* Mar. *Manuka;* Tam. *Drakshai.*

403. Raspberry
H. *Rusbhary.*

404. Rayan: **Mimusops hexandra**
B. *Khukhajur;* H. *Khirni.*

405. Rose apple: **Syzygium jambos**
B. *Jamrul;* G. *Gulab jambu;* Kan. *Panneeralai hannu;* Mal. *Jambakka;* Mar. *Jambhool;* O. *Chota pijuli;* Tam. *Pannirkoyya;* Tel. *Gulab jamun.*

406. Sapota: **Achras sapota**
H. *Sapatu;* Mar., P' *Chiku;* Mal., Tam., Tel. *Sapota.*

407. Seethaphal: **Annona squamosa**
B., O. *Ata;* G., Mar. *Sitaphal;* H., P. *Sharifa;* Kan., Tel. *Seethaphalam;* Mal., Tam. *Seetha pazham;* Other names: Custard apple, Sugar apple.

408. Sirka: **Zizyphus rugosa**

409. Star apple: **Eugenia javanica**
H. *Jambrool.*

410. Strawberry: **Fragaria vesca**
Kash. *Istabari.*

411. Thavittu pazham: **Rhodomyrtus tomentosa**
Mal., Tam. *Thavittu pazham;* O. *Jangli pijuli.*

412. Tirkol-ka-phal

413. Tomato, ripe: **Lycopersicon esculentum**
Kash. *Ruwangum;* Mal., Tam. *Takkali pazham.*

414. Tomatillo: **Physalis ixocarpa**
Other names: Mexican husk tomato, Jamberry.

415. Tree tomato: **Cyphomandra betacea**

416. Tuki: **Diospyros melanoxylon**
Other name: *Kend.*

417. Vikki pazham: **Elaeocarpus oblongus**
B. *Jalpai;* Mal., Tam. *Vikki pazham;* Other name: Wild olive.

418. Wood apple: **Limonia acidissima**
B. *Kathbel;* G. *Kothu;* H. *Kaith;* Kan. *Bele;* Mal., Tam. *Vilam pazham;* Mar. *Kavath;* O. *Kaitha;* Tel. *Velega pandu;* Other name: *Kapith.*

419. Zizyphus: **Zizyphus jujuba**
G., Mar. *Bor;* H. *Ber;* Kan. *Yelachi;* Kash. *Bre'y;* Mal., Tam. *Elanthapazham;* O. *Barakoli;* Tel. *Regu pandu;* Other names: Jujube, Indian plum.

FISHES AND OTHER SEA FOODS

420. Air: **Mystus seenghala**
B. *Air;* H. *Ari;* Kan. *Shede;* Mal. *Karatta;* Mar. *Singala;* O. *Alli;* P. *Chaija;* Tam. *Cumboo kelutti;* Tel. *Multi jella.*

421. Amlet.

422. Anchovy: **Engraulis mystax**
Kan. *Engallu;* Mal. *Nedumanangu;* Tam. *Poruva;* Tel. *Poracalu.*

423. Bacha: **Eutropiichthys vacha**
B. *Bacha;* H.,O. *Bachuva;* P. *Jhalli.*

424. Bali kankda.
B. *Kankda.*

425. Bam: **Mastocembellus armatus**
B. *Bam;* O. *Bummi;* Tam. *Kularal;* Tel. *Mudibommiday;* Other name: *Samp machli.*

426. Baspata machli: **Ailia coilia**
B. *Kajoli;* O. *Bunsputta;* Tel, *Vella kalada.*

427. Bata
B. *Bata.*

428. Bele: **Glassogobius giuris**
B. *Bele;* Kan. *Abbrony;* Mal. *Wartee-poolah;* O. *Gulathi;* Tam. *Nullatan;* Tel. *Bulli-koka;* Other name: *Gooloowah.*

429, Bhanger: **Mugil tade**
430. B. *Bhangon;* Other name: *Dhoka.*

431. Bhangan bata: **Labeo bata**
B. *Bhangan bata;* H. *Gootellah;* O. *Dunguduporah;* Tel. *Mosu.*

432, Bhetki: **Lates calcarifer**
433. B. *Bhetki;* Kan. *Koliji;* Mal. *Chemballi;* Mar. *Khajura;* O. *Durrah;* Tam. *Painnee meen;* Tel. *Pandu chapa.*

434. Bhole:

435. Big-jawed jumper: **Lactarius lactarius**
Kan. *Adai meenu;* Mal. *Adavu;* Tam. *Guthipu;* Tel. *Suduma.*

436. Blue mussel: **Mytilus viridis**

437. Boal: **Wallago attu**
B. *Boal;* H. *Boalee;* Kan. *Bahle;* Mal. *Attuvalai;* Mar. *Shivda;* Tam. *Valai;* Tel. *Valuga.*

438. Bombay duck: **Harpadon nehereus**
B. *Nehare;* Kan., Mar. *Bombli;* Mal. *Bummili;* Tam. *Vangaravasi;* Tel. *Vanamathlu.*

439. Bugda chingri

440. Cat fish: **Arius sona**
Kan. *Shede;* Mal. *Valia etta;* Mar. *Shingala;* Tam. *Keluthi;* Tel. *Jellalu.*

441, Chela: **Chela phulo**
442. B. *Chela;* H. *Dunnahru.*

443. Chiki.

444. Chingru

445. Chingri, goda
B. *Goda chingri*

446. Chital: **Notopterus chitala**
B., O. *Chital;* Tam. *Ambattan-wal.*

447, Crab: **Paratephusa spinigera**
448. B. *Kankra;* G. *Karachlo;* H. *Kenkra;* Kan. *Aedi;* Mal., Tam. *Nandu;* Mar. *Khekra;* O. *Kankada;* Tel. *Peetha.*

449. Dhain: **Solonia silondia**
B. *Dhain;* H. *Baikar;* O. *Jil-lung;* Tam. *Pala keluthi;* Tel. *Pedda chelwa,* Other name: Silond.

450, Fesha
451. B. *Fesha.*

452. Fish meal
Other name: Fish flour.

453. Folui: **Notopterus notopterus**
B. *Folui;* H. *Pholi;* Kan. *Pappasi;* O. *Pulli;* Tam. *Chotta valai;* Tel. *Mangali kathi.*

454. Ghol: **Sciane miles**
H. *Dhoma;* Tam. *Vella-katteelee.*

455. Goggler: **Caranx crumenophthalmus**
Kan. *Banguda hedday;* Mal. *Chamban;* Mar. *Labi.*

456. Golavindalu:
Tel. *Golavindalu.*

457. Golim.

458. Herring, Indian: **Pellona brachy- soma**
Mal. *Kannan mathi;* O.*Paunia puiee.*

459. Herring, ox-eyed: **Megalops cyprinoides**
Kan. *Selakku;* Mal. *Valathan;* O. *Punni kowu;* Tam. *Morancundai,* Tel. *Kannangi.*

460. Hilsa: **Clupea ilisha**
B., H. *Hilsa;* Kan. *Paliya;* Mal. *Paluva;* Mar. *Pala;* Tam. *Oolum;* Tel. *Palasa.*

461. Horse mackerel: **Caranx melampygus**
Mal. *Ovupara;* Tel. *Kuroogooparal*

462. Indian whiting: **Sillago sihama**
Kan. *Kane;* Mal. *Poozhan;* Mar. *Murdi;* Tam. *Kellakkan;* Tel. *Shorangi.*

463. Jew fish (kora): **Pseudosciaena coibor**
Mal. *Kora;* Tam. *Vella kattelee.*

464. Jew fish (pallikora): **Otolithes ruber.**
Mal. *Pallikora.*

465. Joyali magur.
B. *Joyali magur.*

466. Kalabasu: **Labeo calbasu**
B. *Kalvus;* H., O. *Kala-beinse;* Kan. *Kaghi;* Mal. *Karthamin;* Mar. *Kanoshi;* Tam. *Kakkameen;* Tel. *Kaki bontha;* Other name: *Khursha.*

467. Katla: **Catla catla**
B., H. *Katla;* Mal. *Karakatla;* Mar. *Tambra;* O. *Barkur;* Tam. *Theppu meenu;* Tel. *Botchee.*

468. Kholshe.
B. *Kholshe.*

469. Khorsula: **Mugil corsula**
B. *Khorsula;* H. *Answari;* Mal *Thiruta;* O. *Kakunda.*

470, Khoyra: **Gonialosa manminna**
471. B. *Khoyra.*

472. Koi: **Anabas testudineus**
B., O. *Koi;* Mal. *Undee-collee;* Tam. *Sennal.*

473. Koocha machli: **Amphipnous cuchia**
B. *Kucha;* Other name: *Andha samp.*

474. Kucha vetki.
B. *Kucha vetki.*

475. Lady vendi.

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476. Lata: **Ophiocephalus punctatus**
B. *Lata;* H. *Phool dhok;* Kan. *Karava;* Mal. *Kayichal;* O. *Gorissa;* Tam. *Korava;* Tel. *Mitta.*

477. Laukhola.
B. *Laukhola.*

478. Lobster: **Palaemon sp.**
B. *Mocha chengdi.*

479. Mackerel: **Rastrelliger kanagurta**
Kan. *Bangadei;* Mal. *Ayila;* Mar. *Kaula-gedar;* Tam. *Kanan-keluthi.*

480. Magur: **Clarias batrachus**
B. *Magur;* H. *Mangri;* Mal. *Yari-vahlay;* O. *Magurah;* Tam. *Masarai;* Tel. *Marpoo.*

481. Mahasole: **Barbus tor.**
B. *Mahasole;* H. *Naharm;* Kan. *Peruval;* Mal. *Meruval;* Mar. *Khadchi;* O. *Kajra;* Tam. *Kuil;* Tel. *Pedda-polika.*

482. Mandeli.

483. Mangalore fish

484. Modal machh

485. Modki

486. Mowrala: **Amblypharyn godonmola**

487. Mrigal: **Cirrhinus mrigala**
B. *Mrigal;* H. *Naim;* O. *Mirgah;* Tel. *Yerra mosu.*

488. Mullet: **Mugil oeur**
B. *Ain;* Kan. *Mala;* Mal. *Elameen;* O. *Khoiriga;* Tam. *Madavai;* Tel. *Kathi peraga.*

489. Mushi.

490. Mussel, fresh water

491. Muti

492. Oil sardine: **Sardinella longiceps**
Mal. *Nallamathi;* Mar. *Torli;* Tam. *Paichalai;* Tel. *Noonekavallu.*

493. Pabda: **Callichorus pabo**
B. *Pabda.*

494. Pakal.

495. Palmplate
B. *Palmplate.*

496. Pangas: **Pangasius pangasius**
B. *Pangas;* H. *Pangsa;* O. *Jellum;* Tam. *Kovailoola-keluthi;* Tel. *Choluva jella.*

497, Parsey: **Mugil parsia**
498. B. *Parsey;* Mal. *Malan;* Tam. *Chiraya-kandai.*

499. Pata machh.

500. Pollana.

501. Pomfret, black: **Formio niger**
Kan. *Chandratya;* Mal. *Karuppu avoli;* Mar. *Halva;* O. *Bahal;* Tam. *Karuppu-vowal;* Tel. *Nalla sandawah.*

502. Pomfret, white: **Stromateus sinensis**
B. *Chanda;* Kan. *Thondrotte;* Mal. *Vella awoli;* Mar. *Chandava;* O. *Bahal;* Tam. *Mogang vavval;* Tel. *Chanduva.*

503. Prawn: **Penaeus sp.**
B. *Chingri;* Kan. *Segedi;* Mal. *Chemmeen;* Tam. *Yera;* Tel. *Royya.*

504. Puti: **Barbus sp.**

505. Rangoli.

506. Ravas: **Polynemus tetradactylus**
B. *Gurjowli;* Kan. *Vahmeenu;* Mal. *Bahmeen;* Mar. *Ravas;* Tam. *Puzhakkala;* Tel. *Budathamaga;* Other name: *Guchhai.*

507. Ray: **Rhinoptera sewelli**
Mal. *Neithirandi.*

508, Ribbon fish: **Trichiurus sp.**
509. B. *Rupa patia;* Kan. *Pambole;* Mal. *Vellithalayan;* Mar. *Pitiiirti;*

O. *Puttiah;* Tam. *Savalai;* Tel. *Savala.*

510. Rohu: **Labeo rohita**
B. *Ruee;* H., O. *Rohu;* Mar. *Tambada-massa.*

511. Royna

512. Rupapatar

513. Sakchi: **Dasyatis sp.**

514. Sardine: **Sardinella fimbriata**
B. *Khaira;* Kan. *Pedi;* Mal. *Chala-mathi;* Mar. *Pedwa;* Tam. *Seedai;* Tel. *Kavallu.*

515. Sarputi: **Barbus sarana**
B. *Sarputi;* H. *Giddi-kaoli;* Kan. *Gid pakka;* Mal. *Pullan;* O. *Sarana;* Tam. *Kendai-meen;* Tel. *Paraga.*

516. Shankachur.

517. Shark: **Carcharias sp.**
B. *Hangoor;* Tam. *Soorah;* Tel. *Sora chapa.*

518. Shengti.

519. Shrimp

520. Seer: **Cybium guttatum**
B. *Bijram;* Kan. *Khulkul;* Mar. *Towar;* Tam., Tel. *Vanjram;* Other name: *Ayakora.*

521. Silver belly: **Leiognathus insidiator**
Mal. *Chakra mullan.*

522. Singhala: **Arius dussumieri.**
Kan. *Mongam shede;* Mal. *Valia atta;* Mar. *Singhala;* Tam. *Mandai valai;* Tel. *Jadi-jella.*

523. Singhi: **Saccobranchus fossilis**
B., H., O. *Singhi;* Kan. *Chelu meenu;* Mal. *Kahree mee* Mar. *Bitchuka machi;* Tam. *Thelimeen thayi-lee;* Tel. *Mapu jella.*

524. Sode.

525. Sole: **Ophiocephalus striatus**
B. *Shol;* H. *Morrul;* Kan. *Poolikuchi;* Mal. *Kannan;* Mar. *Sohr;* O. *Sola;* Tam. *Virahl;* Tel. *Korrameenu.*

526. Sole (Malabar): **Cynoglossus semifasciatus**
B. *Kukurjibh;* Kan. *Nangu;* Mal. *Manthal;* Mar. *Rhepti;* Tam. *Aral;* Tel. *Jerripothu.*

527, Surmai: **Cybium commersoni**
528. B. *Champa;* Kan. *Arkulai;* Mal. *Chum bum;* Mar. *Tuvar-anjari;* Tam. *Mah-wu-laachi,* Tel. *Konema*

529. Talpatra

530. Tapra

531. Tapsi: **Polynemus paradiseus**
B. *Tapsi;* Other name: Mango fish.

532. Tartoor: **Opisthopterus tardoore**
Mal. *Ambatta;* Tel. *Tartoor.*

533, Tendli
534.

535, Tengra: **Mystus vittatus**
536: B. *Tengra;* Mal. *Kallan-Cooree;* O. *Kuntiah;* Tam. *Auppan keluthi;* Tel. *Yerra jella.*

537. Tunny: **Thynnus macropterus**

538. Vajra

539. White bait: **Anchoviella sp.**

OTHER FLESH FOODS

540, Beef: **Bos taurus**
541. B. *Go-mangso;* G. *Go-mas;* H. *Gai-ka-gosht;* Kan. *Danda mamsa;* Mal., Tel. *Go-mamsam;* Mar. *Go-mans;* O. *Go-mansa;* Tam. *Mattu eraichi.*

542. Boordood:
Other name: Winged white ants.

543. Buffalo meat: **Bulbus bubalis**
H. *Bhains-ka-ghosht;* Mal. *Pothiraichi;* Tam. *Erumai iraichi;* Tel. *Barre mamsam.*

544. Dhauns: **Rana tigrina**
Other name: Indian bull frog

545. Duck: **Anas platyrhyncha**
B. *Hansh;* H. *Bathak;* Mat. *Tharavu;* Mar. *Badak;* Tam *Vathu;* Tel. *Bathu.*

546. Egg, duck
B. *Hansher dim;* G. *Batak nn indu;* H. *Bathak-ka-anda;* Kan. *Bathu motte;* Kash. *Batakh thul;* Mal. *Tharavu mutta;* Mar. *Badak ande;* O. *Bataka dimba;* P. *Bathak-da-anda;* Tam. *Vathu muttai;* Tel. *Bathu guddu.*

547. Egg, hen:
B. *Dim (murgi);* G. *Murgi nu indu;* H. *Murgi-ka-anda;* Kan. *Koli motte;* Kash. *Kokar thul;* Mal., Tam. *Kozhi mutta;* Mar. *Kombdi ande;* O. *Kukkuda dimba;* P. *Kukdi da anda;* Tel. *Kodi guddu.*

548. Egg, turtle:
B. *Jagol dim;* H. *Katchua ka anda;* Mal. *Ama mutta.*

549. Field rat's meat:
H. *Harna chuka-ka-gost.*

550. Finch: **Fringillidoe**
H. *Bageri.*

551. Fowl: **Gallus bankiva murghi**
B. *Murgi;* H., P. *Murga;* Kash. *Kuakur;* Mal., Tam. *Kozhi;* Mar. *Kombdi;* Tel. *Kodi;* Other name: Chicken.

552. Goat meat: **Capra hyrchusb**
B. *Pantar mangso;* H. *Khasi-ka-gosht;* Mal., Tam. *Attiraichi;* P. *Bakri da mas;* Tel. *Meka mamsamu.*

553. Grey quail: **Coturnic coturnix**
H. *Batair.*

554. Liver, goat: **Capra hyrchusb**
B. *Pantar mettle;* H. *Khasi ka jigar;* Mal., Tam. *Attu eeral;* P. *Bakri da kaleji;* Tel. *Meka karjamu.*

555. Liver, sheep:
B. *Mete (vera);* G. *Kaleju;* H. *Kaleji (bher);* Kash. *Kṛe'hnu maaz;* Mal., Tam. *Semmari attin eeral;* Mar. *Kaleej;* O. *Mendha kalija;* P. *Bhed-di-kaleji;* Tel. *Gorre karjamu.*

556. Mutton
B. *Vera mangso;* G. *Ghetanu gos;* H. *Bakri ka gosht;* Kan. *Mamsa;* Kash. *Maaz;* Mal., Tam. *Attiraichi;* Mar. *Mans, sheli;* O. *Manai sa, chheli;* P. *Mas;* Tel. *Mamsamu*

557. Meat of narrow snouted crocodile **Gavialis gangeticus, Gmelin**
H. *Gharial-ka-gosht.*

558. Pigeon: **Columba livia intermedia**
B. *Pyara;* H., P., Mar. *Kabutar;* Kash. *Katar maaz;* Mal. *Pravu;* Tam. *Pura;* Tel. *Pavuramu.*

559. Pork: **Sus cristatus Wagner**
B. *Sukar mangso;* G. *Suvarnu mas;* H. *Suar ka gosht;* Kan. *Handi mamsa;* Mal., Tam. *Panni iraichi;* Mar. *Mans (dukar);* O. *Ghusuri mansa;* P. *Soor da mas;* Tel. *Pandi mamsamu.*

560. Red ants (with eggs) **Aecophylla smaragdina Fab.**
H. *Hau or mata.*

561. Ruff and Reeve: **Philomachus pugnax Linn**
H. *Chaha (bara).*

562. Snail, small: **Viviparus bengalensis f. typica (Lamarck)**
B. *Samuk;* H. *Changhi;* Mal. *Ochu (Cherutharam);* Mar. *Saap.*

563. Snail, big: **Pila globosa**
B. *Samuk;* H. *Ghongha;* Mal. *Ochu (Valiatharam).*

564. Turtle's meat
B. *Jagol mangse;* H. *Kachua-ka-gosht;* Mal., Tam. *Amai iraichi.*

565. Venison: **Antilope cervicapra Linn**
H. *Haran-ka-gosht;* Mal., Tam. *Man iraichi;* Tel. *Ledi mamsamu.*

566. Wood sand piper: **Tringa galareola**
H. *Chahee.*

MILK AND MILK PRODUCTS

567. Milk, buffalo's
B. *Doodh (mosher);* G. *Bhesnu doodh;* H. *Bhains ka doodh;* Kan. *Yemme halu;* Kash. *Maa'shi duad;* Mal., Tam. *Erumai pal;* Mar. *Doodh (maaish);* O. *Mainsi dudha;* P. *Mahin-da-doodh;* Tel. *Barre palu.*

568. Milk, cow's
B. *Doodh (garu);* G. *Gaynu doodh;* H. *Gai-ka-doodh;* Kan. *Hasuvina halu;* Kash. *Gaav duad;* Mal., Tam. *Pasum pal;* Mar. *Doodh (gay);* O. *Gai dudha;* P. *Gau-da-doodh;* Tel. *Avu palu.*

569. Milk, goat's
B. *Doodh (chagal);* G. *Bakrinu doodh;* H. *Bakri-ka-doodh;* Kan. *Adina halu;* Kash. *Tshaavgi chir;* Mal., Tam. *Attu pal;* Mar. *Doodh (sheli);* P. *Bakri-ka-doodh;* Tel. *Meka palu.*

570. Milk, human:
B. *Doodh (Manush);* G. *Strinu doodh;* H. *Aurat ka doodh;* Kan. *Yede halu;* Mal. *Mula pal;* Mar. *Doodh (Stri);* O. *Maa dudha;* P. *Janani-da-doodh;* Tam. *Thai pal;* Tel. *Chanu palu.*

571. Milk ass's:
H. *Gadhe ka doodh;* Mal., Tam. *Kazhutha pal;* P. *Khothi-da-doodh;* Tel. *Gadida palu.*

572. Curds:
B. *Doyi;* G., H., Mar., O., P. *Dahi;* Kan. *Mosaru;* Kash. *Zaamut duad;* Mal., Tam. *Thayir;* Tel. *Perugu;* Other names: Yoghourt, Sour cream.

573. Butter milk
B. *Ghol;* G. *Chhas;* H., P. *Lassi;* Kan. *Majjige;* Kash. *Chuaku duad;* Mal., Tam. *Moru:* Mar. *Tak;* O. *Ghola dahi;* Tel. *Majjiga.*

574, Channa
575. B. *Chana.*

576. Cheese
B., G., H., P. *Paneer;* Kan. *Ginnu;* Kash. *Tsaama;* Mal., Tam. *Pal katti;* O. *Chhena;* Tel. *Junnu.*

577. Kheer
B., H., P. *Kheer.*

578- Khoa
580. B., H., Kan., Mal., P., Tel. *Khoa;* O. *Kua;* Tam. *Thirattu pal.*

581, Skimmed milk
582. B. *Makhantana doodh;* Kash. *Gurus;* Mal. *Padakalanya pal;* O. *Sarakadha dudha;* Tam. *Kadaintha pal;* Tel. *Venna theesina palu.*

583. Whole milk powder
B. *Goora doodh;* Mal., Tam. *Pa: thool;* O. *Dudha gunda;* Tell *Pala podi.*

FATS AND EDIBLE OILS

584. Butter
B., H., P. *Makhan;* Kan. *Benne;* Kash. *Thany;* Mal., Tel. *Venna;* Mar. *Loni;* Tam. *Vennai.*

585, Ghee
586. B., H., P. *Ghee;* Kan. *Thuppa;* Mal., Tam. *Ney;* Mar. *Thup;* Tel. *Neyyi.*

587. Hydrogenated oil
B. *Banaspati;* Other names. Vanaspati, Vegetable ghee.

588. Vegetable cooking oil
B., H., Mar., *Tel;* Kan., Mal., *Enne;* Tam. *Ennai;* Tel. *Noone.*

MISCELLANEOUS FOODS

589. Adda: **Bauhinia vahlii**
Tel. *Adda;* Other name: *Lama-ke-biya-ka-gudda.*

590. Amaranth seeds: **Amaranthus sp.**
Mal. *Cheera vithu;* Tam. *Keerai vidai;* Tel. *Thotakoora ginjalu.*

591. Areca nut: **Areca catechu**
B., H., Mar., P. *Supari;* G. *Sopari;* Kan. *Adike;* Mal. *Adakka* O. *Gua;* Tam. *Pakku;* Tel. *Vakka;* Other name: Betel nut.

592. Arrowroot flour: **Maranta arundinacea**
B. *Tavkeel;* Mal. *Koova podi;* Mar. *Toukil;* O., P. *Araroot;* Tam. *Kuva mavu;* Tel. *Pala gunda.*

593. Avocado pear nut: **Persea drymifolia**

594. Bajjar bhang

595. Barai dal

596. Betel leaves: **Piper betle**
B. *Pan;* G. *Nagarvelna pan;* H. *Pan-ka-pata;* Kan. *Vilaid yele;* Mal., Tam. *Vettilai;* O. *Pana;* P. *Pan da patta;* Tel. *Thamala-paku.*

597. Bhangari

598. Bhangri-ka-atta

599. Bhilisa of Elo

600. Bhoose-ka-atta

601. Bhorra chattoo

602. Bid root: **Scirpus grossus**
B., H. *Kasuru;*

603, Biscuit
604.

605, Bread
606.
B., H., *Roti;* Other name: *Double roti.*

607. Cane sugar: **Saccharum officinarum**
B., H., P. *Chini;* Kan. *Sakkare;* Kash. *Madrar;* Mal. *Panchasara;* Tam. *Sarkarai;* Tel. *Pancha dara;* Other name: *Sakkar.*

608. Cholai

609. Chookri-ka-atta

610. Chookri-ka-patta

611. Chota karhani chatto
Other name: *Langra chattoo.*

612. Chukary

613. Coconut, tender: **Cocos nucifera**
B., *Dab;* Kan. *Yelnee;* Mal. *Karikku;* Mar. *Shahale;* O. *Paida;* Tam. *Elani;* Tel. *Letha kobbari.*

614. Coconut milk: **Cocos nucifera**
B. *Narikel doodh;* H. *Nariyal-ka-doodh;* Kan. *Kobbare halu;* Mal., Tam. *Thenga pal;* P. *Golc-da-doodh;* Tel. *Kobbari palu.*

615. Coconut water: **Cocos nucifera**
B. *Daber jal;* G. *Pani nariyal;* H. *Nariyal-ka-pani;* Kan. *Thenga neeru;* Mal. *Thenga vellam;* Mar. *Naral pani;* O. *Paida pani;* P. *Gola da pani;* Tam. *Ilanir;* Tel. *Kobbari neeru.*

616. Coconut meal,deoiled: **Cocos nucifera**
Mal., Tam. *Thenga punnakku;* Tel. *Kobbari pindi.*

617. Cowage seed flour: **Mucuna capitata**
H. *Kabach sattoo.*

618. Daincha seeds

619. Dingil chhattoo: **Collybica sp.**
Other name: *Baskhukhri chattoo.*

620. Elo

621. Fish liver oil
B. *Matsha tel;* G. *Machhiline tel;* H. *Machli-ka-tel;* Kan. *Meen yenne;* Mal. *Meen enna;* O.

Machha tela; Tam. *Meen ennai;* Tel. *Chapa noone.*

622. Groundnut cake: **Arachis hypogaea**
B. *Badamer khol;* H. *Chinia badam-ka-khali;* Mal., Tam. *Kadalai punnakku;* Mar. *Pend;* Tel. *Verusanaga pindi.*

623. Honey
B. *Mou;* H. *Shaid;* Kan. *Ten thuppa;* Kash. *Maanch;* Mal., Tam. *Then;* Mar. *Madh;* Tel. *Thene.*

624. Jack fruit seeds: **Artocarpus heterophyllus**

625, Jaggery
629. B., H., P. *Gud;* G. *Gol;* Kan. *Bella;* Kash. *Gor;* Mal., Tam. *Vellam;* Mar. *Gul;* O. *Guda;* Tel. *Bellum.*

630. Kalipakku
B. *Khoir;* Mal. *Kaii adakka;* O. *Kanchagua sijha;* Tam. *Kalipakku.*

631. Kittul flour: **Caryota urens**
G. *Shiva jata;* H. *Mari;* Kan. *Bagani;* Mal. *Kudappan mavu;* Mar. *Berli;* Tam. *Coondapanai;* Tel. *Jilugu chettu;* Other name: Talipot flour.

632. Lamtra

633, Lotus seeds: **Nelumbium nelumbo**
634. Mal. *Thamara vithu;* Tel. *Thamara ginjalu.*

635. Madapu ginja
O. *Ganjei.*

636. Mahua flowers: **Bassia latifolia**
Tam. *Iluppai poo;* Tel. *Ippa puvvulu.*

637. Makhana: **Eurvale ferox**
G., H. *Makhana.*

638. Malted palmyra root
Mal., Tam. *Panam kizhangu;* O. *Tala kanda;* Tel. *Thegalu.*

639. Mango seed kernel: **Mangifera indica**
H. *Am-ka-guthli-ka-atta;* Mal. *Manga andi parippu;* P. *Am-di-guttak;* Tel. *Mamidi jeedi.*

640. Mango powder: **Mangifera indica**
H. *Am choor.*

641. Marking nut: **Semecarpus anacardium**
Tel. *Nalla jeedi ginjalu;* Other name: *Velwa-ka-topi.*

642. Mushroom
H. *Tila chhattoo;* Mal. *Koon;* Tam. *Kalan;* Tel. *Kukka godugu.*

643. Neera

644. Pachwai (Assam)

645. Papad
B., H. *Papar;* G., Mar., P. *Papad;* Kan. *Happala;* Mal., Tam. *Pappadam;* O. *Pappada;* Tel. *Appadam.*

646. Perandai: **Vitis quadrangularis**
B. *Har;* H. *Hadjora;* Kan. *Perundai;* Mal., Tam. *Perandai;* O. *Siju;* Tel. *Nalleru.*

647. Phutka chattoo (Rugroo): **Lycoperdon sp.**
Other name: Puff ball mushroom.

648. Poppy seeds: **Papaver somniferum**
B. *Posto;* H. *Post dana;* Mar. *Khaskhas;* Tam. *Khasakhasa;* Tel. *Gasagasalu.*

649. Pumpkin seeds: **Cucurbita maxima**
B. *Kumdar dana;* Mal. *Mathan vithugal;* P. *Sitaphal-di-bee;* Tel. *Gummadi ginjalu.*

650. Rajakeera seeds: **Amaranthus paniculatus**

651. Red palm oil: **Elaies guinensis**

652. Roselle seeds

653. Sal-ka-phal: **Shorea robusta**

654. Sago
B. *Saboo;* G., Mar. *Sabu dana;* H., Mal. *Sago;* Kan. *Sabba akki;* Kash. *Saboo dana;* O. *Sagu dana;* Tam. *Javvarisi;* Tel. *Saggu biyyam.*

655- Sea weeds
656.
Mal. *Kadal chandi;* Tam. *Kadal pasi.*

657. Sugar cane juice
B. *Ikkhu raush;* G. *Sherdina ras;* H. *Ganne-ka-ras;* Kan. *Kabbina halu;* Mal. *Karumbin neeru;* Mar. *Usacha rasa;* O. *Akhju dorua;* P. *Ganne-da-ras;* Tam. *Karuppan charu;* Tel. *Cheraku rasam.*

658. Tamarind seed kernel: **Tamarindus indicus**
H. *Imli-ka-biya-ka-gudda;* Mal. *Pulin kuru;* Tam. *Puliyam kottai;* Tel. *Chinta ginjalu.*

659, Toddy

660. B. *Tari;* H. *Tarail;* Kan. *Henda;* Mal., Tam., Tel. *Kallu;* Mar., O. *Tadi.*

661. Water lily seeds: **Nymphaea nouchali**

662. Water melon seeds: **Citrullus vulgaris**

663. Yeast.

664. G., Mar. *Khamir;* Tam. *Khadi.*

INDEX OF FOODSTUFFS

The following abbreviations have been used:
B.—Bengali; G.—Gujarati; H.—Hindi; Kan.—Kannada; Kash.—Kashmiri; Mal.— Mulayalam; Mar.— Marathi; O.—Oriya; P.—Punjabi; Tam.— Tamil; Tel.—Telugu.

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